AMERICAN GAS ASSOCIATION MONTHLY

British Gas Engineers Accept A. G. A. Invitation To Visit America for 1933 Meeting

A Few Thoughts on Load Building for Gas Industry

MORSE DELLPLAIN

Household Test of Slow Recovery Water Heater

E. J. DEVLIN

Holding the Cooking Load

HALL M. HENRY

Dealer Aid To Meet Fuel Competition

E. V. BOWYER

Henry L. Doherty Speaks Over Moonbeam to His Organization

June, 1932

1931 PROCEEDINGS

of the Annual Convention of the AMERICAN GAS ASSOCIATION

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Back Home

AFTER a good many years of comparative unimportance, the American home is enjoying an astonishing popularity. It is once more the center of things.

A number of influences were responsible for the temporary eclipse of the home. A man used to work from ten to twelve hours a day. Then he had to spend two or three hours in a barroom or lodge to get feeling human again. His wife worked even longer hours because no one had thought of making housework easy. Of course the children didn't find that sort of home attractive and sought happiness elsewhere. Then the movies came, and for a while the exodus was complete. The low-priced car followed and people started in to see what the world looked like.

But just check off what has happened. People now do most of their entertaining at home. That is probably what started this back-to-the-home movement. The clean automatic heater has made possible the popular "Rumpus Room" in the basement, with a return of ping pong and pool. Shorter hours have given people more time to enjoy their homes. Then old-fashioned housework disappeared with the advent of electric appliances, washing machines, automatic refrigerators, oil or gas heaters, vacuum cleaners and such, and women took up interior decoration and bridge. Radio finished the job. The home is about the only place where one is sure of a good show, any more. An evening that doesn't offer your choice of one hundred thousand dollars' worth of entertainment is the exception.

You can have dance music of the finest, comedians of the $5.50 revues, grand opera right from the stage, the world's greatest instrumentalists, play-by-play football from California to Maine, spot news, ringside seats, a chat with the President, after-dinner oratory, philharmonic symphonies, historical drama, home hints, and, incidentally, quite a lot of information about merchandise. When you come to think about it calmly, it is a bit unreasonable for a man who has enjoyed, for nothing, superb entertainment that would have cost him fifty dollars outside his home to protest bitterly against the few minutes devoted to commercial announcements.

It is our belief that this home trend has barely started. Let's indulge in a little crystal-gazing.

Think what home movies might develop into, or home talkies, for that matter. If people are going to stay at home, they can use a lot of diversion. It would be fun to have a good yarn acted out. We could have a weekly news reel. In fact, these things exist now. When five or ten million prosperous families get on to the idea, there is a big industry in it.

Of course television is still a laboratory adventure, but so was radio a few months before about every second home had it.

Radio itself has only scratched its possibilities. So far, we have barely grasped the rudiments of how to build a radio program that will please twenty million listeners. Big minds are planning big things. We might even go so far as to give radio some educational value. Keep your eye on radio—it's still an infant.

The home itself is just escaping from the castle complex. It really doesn't have to be a decorated dungeon of stone. People are beginning to experiment with steel and glass—a glass which admits violet rays. Suppose a trend started to live in homes as healthfully sunny as a golf course.

Scientists have been giving a lot of study to air. The air most of us breathe at home is awful. Dirty, too dry or too moist, drafty and never the right temperature. It is actually possible today to have absolutely perfect air the year round. It won't be long before everyone knows it. Then a house without good air will be as unsalable as one without running water.

Every city is surrounded by many thousands of acres of practically unused land. Before long, people will be living on those acres. The movement has already started. With fast cars and perfect roads, to live twenty or thirty miles from one's work doesn't mean anything. When airplanes get a little farther along, fifty to one hundred miles won't mean anything. It looks as though there will be considerable building for some time to come.

But people wont be able to afford all these things, you say. In the memory of the writer, only the wealthy could afford bathrooms—and one to a house, at that. Queen Victoria didn't have one in Buckingham Palace. Only a little while ago, a car was a millionaire's luxury, a telephone was an indulgence, and electric lights were an extravagance.

But when the people of America want a thing, they collectively and individually get busy and possess it. All the economists in the world can't stop them. It may not be logical, but that's the way it works out. The reason the United States is a great market is that everyone in it is willing to work his head off to reduce luxuries to necessities—so that he may have them.

We seem to have come a long way from the stone age, but the distance is nothing, compared to where we are going. We are going to make living worthwhile; and when we have learned, we shall net a good profit from showing the rest of the world how to live well.

If you are making something that adds to the comfort and pleasure of home living don't lose hope.—*The Wedge,* published by Batten, Barton, Durstine & Osborn, Inc., Advertising, New York.

AMERICAN GAS ASSOCIATION MONTHLY

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VOLUME XIV | JUNE, 1932 | NUMBER 6

Production, Sales, Dealer And Tax Problems Feature Natural Gas Sessions

By Keith Clevenger

Director of Publicity and Advertising, American Gas Association

THE annual convention of the Natural Gas Department, American Gas Association, held in Tulsa, Oklahoma, May 9 to 11, has gone down the hall of association history as a memory of acquaintances renewed and new friends made, as well as a stimulus of inspiring addresses and illuminating papers on vital needs of the industry. Reports indicating the substantial progress of the various committees of the department in their studies of modern natural gas production, transportation, distribution and sales problems, also contributed to the intense interest manifested by those who attended the three-day meeting.

For the first time since the merger of the Natural Gas Association of America with the American Gas Association the convention was held in the heart of the great natural gas oil producing territory of the Southwest—Tulsa, the oil and gas capital of the world. In this center of large-scale gas production, where all business, whether it be banking or manufacturing, retail merchandising or whatnot, has its being largely because it revolves about oil and gas operations, there was an atmosphere of friendly interest in and understanding of the problems of the convention and its attendants.

Further enjoyment of the meeting was materially increased by the unsurpassed hospitality, the capable supervision of every detail of both business and entertainment sessions of the convention by the officers and men and women of the Oklahoma Natural Gas Corporation, under the leadership of E. A. Olsen, president of this utility organization

Natural Gas Men Address Tulsa Civic Clubs

DURING the sessions of the Natural Gas Department convention speakers were supplied to the various civic clubs of Tulsa, addressing these organizations on subjects pertaining to the natural gas business, its growth and its problems.

Speakers and the clubs they addressed were as follows:

Kiwanis Club, A. E. Higgins, secretary, Natural Gas Department.

Civitan Club, Earl W. Hodges, director of public relations, Henry L. Doherty & Co., New York.

Advertising Club, Keith Clevenger, director, Publicity and Advertising, American Gas Association, New York.

Rotary Club, Major T. J. Strickler, vice-president, Kansas City Gas Company and chairman, Natural Gas Department.

Lions Club, E. F. McKay, managing director, Oklahoma Utilities Association, Oklahoma City.

Optimist Club, Keith Clevenger, director, Publicity and Advertising, American Gas Association, New York.

Group of executives who attended the Natural Gas Convention. They are, from left to right—H. C. Cooper, of Pittsburgh, Hope Natural Gas Company; Thomas R. Weymouth, New York, Columbia Gas and Electric Corp.; T. J. Strickler, chairman of convention, Kansas City; Alexander Forward, managing director, American Gas Association; E. A. Olsen, of Tulsa, president of the Oklahoma Natural Gas Corporation, and A. E. Higgins, of Dallas, secretary of the Natural Gas Department

which serves practically every important center of Oklahoma with natural gas, and the cooperation of other utilities, the city officials, business leaders and the local press.

While the programs of these annual Natural Gas Department meetings are prepared with a view of affording an opportunity for the study and discussion of operating processes as they relate to production and transportation and distribution, and the technical and research work necessary to the conservation and economic handling of natural gas from field to consumer, the sales problem with all its related factors of rates and regulation, utility merchandising and increasing dealer relations, taxation and internal and external industrial relations had a most important place on the program and received most serious and constructive treatment by speakers prominent in the industry for their accomplishments in their respective fields.

The keynote of the convention and the industry's operating problems and its relationship to its stockholders, its customers and the public was voiced by Major T. J. Strickler, of Kansas City, chairman of the Natural Gas Department, in his opening address before the convention. He said, in part:

"The natural gas industry is confronted with every problem known to modern business, and in addition we have many problems peculiarly our own. It is the primary object of this group assembled here to look many of these important problems straight in the face and find a workable solution for them during the few days of our convention.

"Our industry has grown to such proportions in the past few years that it is difficult even for those connected with it to realize its magnitude. The natural gas industry represents a capital investment of from two to three billion dollars. In order to break this figure down so that we may more easily comprehend the true size of our industry, we will put it into a more simple form. The total investment of the natural gas industry represents an investment of fifteen to twenty-five dollars for every man, woman and child living in the United States. Such examples help us to realize the magnitude of our industry.

"Here is an old industry suddenly developed in the last twelve years into one of the largest industries in the world.

"Natural gas is bringing comfort and convenience to a population in excess of twenty-two million people. It is increasing the efficiency and decreasing production costs in thousands of industrial plants. It has lifted a great burden from many shoulders and is a closely woven part of our daily lives.

"One of the most serious problems facing our industry today, as well as other businesses, is the ever-increasing burden of taxation. A time when our national income is decreasing is certainly not an opportune time to increase governmental expense.

"Our Association should forcibly express itself on the alarming increase in governmental expense and taxation and every member of our Association should use his influence in the correction of the evil of increased taxation.

"Billions of dollars of capital have been invested to build thousands of miles of pipeline and to expand every division of our industry in proportion, and now it becomes our duty to earn a fair return on the funds that have been invested with us, and at the same time continue to maintain and improve our services from year to year. Any new uses for gas which will improve the daily or annual load factor should be given serious attention and encouragement by the gas industry. We must justify the faith that our stockholders have in us and extend this faith in order to insure future credit.

"It is necessary for us to study our

One Charter Member Attends Meeting

C. W. Sears, of Pasadena, California, was the only one of the thirteen charter members of the Natural Gas Association of America, organized in Kansas City, Mo., twenty-six years ago, attending the natural gas department convention at Tulsa. He and Col. M. W. Walsh, of the Louisville Gas and Electric Company, are the remaining two charter members still active in the gas business. This was the first time Mr. Walsh had missed a natural gas meeting since the first one in 1906.

marketing problems and build a load for the permanency of our industry. Everyone in the gas industry must realize that we are in the business to sell gas. Our product is one of the nation's most valuable fuels. It has a definite and permanent place in the future progress of our nation. Through new business operations and dealer cooperation we have comfort, cleanliness and convenience to sell to every family on our lines. To every industrial plant we have efficiency and increased production to sell. We have an abundance of our product and our markets must be developed to a point where our investments will pay a fair return. The one way to assure this is to sell more gas.

"To further our endeavor to keep abreast of the trend of time, our industry, through the American Gas Association, should encourage, to the utmost, our testing laboratories and our own engineers in finding new uses for gas. Our Association is doing a great work in its research activities.

"In addition to those conducted by the Natural Gas Department on orifice meters, pipeline flow and gas well deliveries, section committees and general committees have been engaged in research problems which are of value to the natural gas companies. The work which is now being done on air conditioning and house cooling should be especially valuable since it promises to develop for us a summer load of considerable magnitude. The work on new and improved industrial uses for gas falls in a similar classification, since it will help to develop our industrial sales of gas, which, generally speaking, have a good load factor. The mixed gas research is of particular interest to those companies who will bring natural gas to mix with the manufactured gas, or who will use manufactured gas to replace declining supplies of natural gas. There is the special committee which is studying the problems involved in changing from manufactured to natural gas operation. The research work on pipe coatings and corrosion is one in which we are all interested and important results should be accomplished. The pipe joint research has so far dealt largely with cast-iron joints, but an enlarged program is to consider all types of joints used in a gas system. In addition to these few items which I have mentioned, various other committees are engaged in research work which has to do with production, transmission, distribution, utilization, sales and various other matters such as rates, public relations, advertising, etc."

Cowboy orchestra was among convention entertainment features

Indian "stomp dancers" at Tulsa convention

Monday morning, May 9, was given over to the meetings of the Main Technical and Research Committee, under the leadership of H. C. Cooper, of Pittsburgh, Penn., chairman, and the various active subcommittees, as well as a joint meeting of the subcommittee on Code for Testing Natural Gas for Gasoline Content and a committee of the Natural Gasoline Association of America.

That afternoon Major Strickler called the convention to order, and after the address of welcome delivered by W. J. Graham, secretary to the Mayor of Tulsa, Mr. Olsen delivered the chairman's annual address, excerpts of which have already been quoted, in which he outlined the progress of the department's work during the past year and pointed out some of the problems with which the industry must cope if its forward march of progress is to continue.

R. W. Gallagher, of Cleveland,

president of the American Gas Association, indicated in his address some of the major difficulties with which the industry is faced as well as emphasizing its facilities and its opportunities for meeting them. Commenting on these problems Mr. Gallagher divided them into three classes as follows: (1) "improved and increased use of natural gas," (2) "the political and commercial problems affecting its satisfactory distribution and sale," and (3) "the financial aspects of the industry."

"If I say we have not yet come in sight of the limits of gas use," said Mr. Gallagher, "it is because I want to stress the word 'use,' and the very vital necessity of our best and most highly concentrated study of gas utilization. It is along these lines that I think we are beginning to make the most important progress, and it is along these lines, of course, that a full realization of our opportunities is to be found.

"Of all the many theories and explanations which have been offered as a cure of our economic ills, in the last two or three years, and there is hardly anybody who has not intensively studied these subjects, one of the most impressive to me is the document put out by Dr. Adelbert Ames, a Dartmouth professor.

"The key to his economics, as nearly as it can be briefly described, is research, plain matter-of-fact industrial research, and his argument is for an ever greater emphasis on research and technical development as being our greatest opportunity for discovering new economic horizons. He strikes at the root of matters in urging the development of new sources of business.

"Competition is coming to have a new significance in the light of business development. Business is going to those agencies which can serve it best, and I do not think that the American people will worship cheapness in price, in the future, quite so blindly as they have in the past.

"New methods of applying gas heat in industry are rewarding the work which has been done along these lines.

"The same is true of the domestic uses of gas and is due very largely to the same causes, namely, intensive development and design both from a combustion and application viewpoint.

"In common with all industries and all business, the natural gas industry has been passing through, and is still passing through, a stormy and distressful period.

"Especially injurious is the growing practice of legislators to get out of their own financial difficulties by using the public utility service as a tax collecting agency.

"The effect on rates and on lessened consumption due to tax-raised rates is well known to us. Lowered consumption again entails higher rates to sustain the service—and the vicious cycle goes on to ultimate destruction of both service and investment.

"Our job then, as I see it, is to inform our customers by taking these hidden taxes out from behind their concealment. We must restore tax consciousness to the people who are being hoodwinked and deceived.

"As our business and our future depend upon the service which we can render the public, so our security and welfare depend upon our public candor. Let us, therefore, in good faith and by real action reduce our tax problems to their lowest terms and keep them in these simple terms before our customers."

Alexander Forward, managing director of the American Gas Association, conveyed the greetings of the united gas industry to the meeting and outlined briefly the outstanding activities of the Association in its service to the natural gas members, particularly mentioning the work of the technical, the legislative, and the trade dealer cooperation committees and the proposed national advertising campaign of the Manufacturers' Section of the Association.

In the closing address of the afternoon session Walter F. Ferguson, vice-president of the Exchange National Bank, of Tulsa, and a leading figure in oil and gas financing in the Southwest, presented a most interesting picture of the changing conditions in the oil and gas business and their effect on and relation to public welfare. He urged unceasing interest in conservation of natural gas, both as a protection to the industry and its financial standing as well as in the interests of preserving to posterity every possible cubic foot of this natural fuel and the final divorcement of the gas business from political "hi-jacking."

Following the annual meeting and dinner of the managing, executive and advisory committees, at the Mayo Hotel, convention headquarters, the convention visitors were taken in automobiles and busses to the new State fair grounds, where the International Petroleum Exhibitions are staged and there treated to a barbecue and an entertainment which only visitors to Oklahoma can enjoy—an Indian "stomp" dance, an Indian orchestra, and a program of horsemanship provided by Tulsa's famous Mounted Boys' Patrol.

Beginning Tuesday morning, May 10, the convention gave its attention largely to addresses and papers dealing with its sales and dealer cooperation problems and the need for the development of new uses for gas as an essential to continued progress and prosperity of the industry.

LeRoy M. Edwards, general counsel of the Southern Counties Gas Company, Los Angeles, California, urged a greater degree of dealer cooperation, understanding of the local dealer problem on the part of the utility and a program leading to a community of interest between the gas utility and the retail appliance dealers. He reviewed the growth of anti-utility merchandising agitation and legislation and proposed definite remedial steps for their abatement. He said in part:

"There is probably no question before the gas and electric industry today that is more vital or of greater interest than the question of how to best meet the drive that is being made to legislate the utilities out of the appliance merchandising field. Many see in the movement a subtle, undercover attack against the utilities by the proponents of municipal ownership. Whatever the underlying cause may be, the issue is a real one. We are bound to be confronted with the same issue again in the legislatures of next year, unless we adjust the differences that now exist between us and the independent merchants.

"That the utilities have the legal right to engage in the sale of appliances using gas and electricity is certain.

"The economic reasons that impel the utilities to engage in the sale of

appliances seem equally apparent, both from the standpoint of the general public and from the standpoint of the utility. The position of the utility toward the general public is different from that of the independent merchant. The property of the utility is dedicated to the service of the public; it has a public duty to perform from which, when once undertaken, it can not recede.

"The active participation of the utilities in merchandising is necessary if the public is to receive the benefit of new types of appliances. Our service to the public suffers if the appliance becomes inadequate for any reason. We are judged by the results produced by the appliance. If we are to be judged by this standard, have we not the inherent right to have an active voice in the type of appliances sold? We are constantly hammering on the manufacturers to produce better types of ranges, water heaters, and space heaters. The manufacturer, as a rule, cannot afford to bring out a new product unless assured of a fair immediate market. This the merchandising utility affords him. The local independent dealer is seldom willing or financially able to pioneer. He will carry established lines, but he dare not venture into the new and unproven. The burden of pioneering must always rest with the utility."

A. E. Bettis, of Kansas City, president of the Missouri Association of Public Utilities, discussed in detail the dealer situation in Missouri and outlined the program his association is utilizing to correct this condition. Discussion of this paper was participated in by F. M. Rosenkrans, Gas Service Company, Kansas City, presenting the utility viewpoint and T. E. Bullion, Detroit-Michigan Stove Company, the appliance manufacturer's problems.

The need for the development of new uses for gas as well as an aggressive program sponsored by the gas utility industry for the improvement of all present uses of gas, and the responsibility of the gas business for these developments and improvements was most emphatically stressed by Henry O. Loebell, of New York, vice-president of Combustion Utilities.

"The value of gas service is determined strictly by the performance of the appliance," said Mr. Loebell. "This truth is self-evident so that no explanation of it is necessary. A customer purchases gas purely for the service that it renders through the appliance installed. Consequently the progress of the gas industry, so far as the public acceptance of gas is concerned, is largely in the hands of the appliance manufacturer.

"Today, however, the situation has changed," Mr. Loebell stated. "The competition of electricity, butane, oil and coal has awakened our industry. The inroads of these fuels have reduced our volume of sales and seemingly have begun to threaten our position. The fallacy of encouraging internal competition among appliance manufacturers with no regard to the activities of external competitors has become apparent. The development of new and improved appliances to meet competition and to invade new fields has become a vital necessity. And the realization of this new trend of thought is evidenced by the interest in developments and the financial support which was extended to the Industrial Research Committee the last four or five years. This committee has made excellent progress with its limited funds and has contributed much to the retention of existing markets and the development of new fields. Of its later accomplishments, the house-cooling unit is probably of greatest interest."

Mr. Loebell told of proposed new developments particularly an entirely new gas range designed on a revolutionary principle and the energy unit development. The industrial field also offers unlimited opportunities. The question involved is who is to develop these and other new and improved appliances and equipment. Should the manufacturers themselves accept the responsibility or should they drift with the wind and change from first one to another with the trend without any material expense to themselves.

"The gas industry cannot afford to permit this," he said. "It must have new appliances, superior appliances to meet the increasing competition. And it must provide the incentive for the development of such appliances.

"We can no longer afford to compromise opposing factions which are delaying progress, but must obtain some definite action which will permit us as an industry to engage in direct competition with those interests who are invading our established domain."

The report of the Main Technical and Research Committee was presented by H. C. Cooper, Hope Natural Gas Company, Pittsburgh, calling attention to the three major projects of gas measurement under the direction of a committee headed by T. R. Weymouth, New York; the pipe line flow studies conducted under the direction of H. D. Hancock, New York, and gas well deliveries, by E. L. Rawlins, of the Bureau of Mines, Bartlesville, Okla.

Tuesday afternoon's session, presided over by L. K. Langdon, Columbus, vice-chairman of the Natural Gas Department, was given a stimulating impetus by the address of E. B. Reeser, Tulsa, president of the Barnsdall Oil Company, and a former president of the American Petroleum Institute. Mr. Reeser counselled care and conservatism in expansion of facilities, greater activity of the men of the industry in

(Continued on page 274)

Members attending Natural Gas Convention

Buncombe!

By Alexander Forward

Managing Director,
American Gas Association

A FAIR sample of the absurd claims now made in numerous quarters by interests promoting electric cooking, and which often remind one of the unethical competitive practices of past ages, is an editorial in the *Electrical World* of April 13 last.

This editorial lists four alleged advantages for electric ranges, as follows:

1. The preservation of flavor and moisture in baked or roasted foods because the atmosphere inside the electric oven is not constantly changing as in a fuel-fired range.

2. Greater comfort of cooking on an electric range due to better heat insulation of the oven and the fact that heated air is not constantly discharged from open burners and oven vents.

3. Avoidance by electric operation of the danger of asphyxiation.

4. Vitiation of the air from fuel-fired ranges is avoided.

Extensive scientific tests during 1931 and 1932, results of which have been published by the American Gas Association, indicate no difference whatever in the quality or flavor of the cooked product as between a modern gas range and a modern electric range. The electric claim for non-shrinkage as an advantage over gas cooking cannot be substantiated. As to circulation of air, some electric ranges, at least, discharge cooking odors outside of the oven and it is the opinion of experts that all ranges should; otherwise the oven linings on any type range gradually absorb all these different odors and eventually produce a very disagreeable concentration of odor in the oven baking space. Studies by experts show that any superiority claimed for the electric oven is purely mythical.

It is clearly demonstrable, and has been demonstrated, that a large number of modern gas ranges are better insulated than the best electric ranges. While it is true that a small amount of heat is discharged from the top burners of an open top type gas range, the same thing is true to almost as great an extent from the pop heating elements of an electric range, is a matter of opinion therefore if this small distance is not offset by the circulation created.

As a result of the requirements and testing program of the American Gas Association Testing Laboratory, in Cleveland, the modern gas range is as safe as it is possible to make any mechanical device. Perhaps the writer of the editorial can produce a case of accident from a range bearing the approval seal of the American Gas Association.

Mathematical calculations, under test conditions produced and reproduced hundreds of thousands of times, show that the usual gas range, even when operating at the full capacity of its burners with normal air supply, does not vitiate appreciably the surrounding atmosphere. The normal process of combustion, as indicated above, results in circulation of the kitchen air which encourages ventilation and probably offsets the slight consumption of oxygen. Under any reasonable conditions of usage the consumption of oxygen is never sufficient to be appreciable or to cause any annoyance or uncomfortable effects upon the user. As a matter of fact everybody who has studied this subject knows that vitiation of oxygen in a room, say, with two burners on a gas stove, unless the room is hermetically sealed with extreme care is too slight to be measured even if it exists at all.

I conclude with the brief and devastatingly unqualified comment of Dr. Cecil K. Drinker of the Department of Physiology of the Harvard University School of Public Health and America's foremost authority on asphyxiation: "Paragraph 2 in the statement you sent me (*Electrical World* editorial) is entirely ridiculous."

It is not enough, however, that we of the gas industry know that each and every claim of superiority for electric cooking has no foundation in fact. In view of misrepresentative tactics it is necessary for us to tell the public about it.

Employees Set High Mark in Rutgers' Gas Course

FIFTEEN students, all employees in the Commercial Department of the Public Service Electric and Gas Company in New Jersey, have set what seems to amount to an enviable record in the course in Manufacture, Distribution and Utilization of Gas, prepared and offered by the University Extension Division at Rutgers University under the sponsorship of the American Gas Association. Every one of these students who entered upon this practical and comprehensive home study course in gas had completed his entire requirement of twenty-one individual lesson assignments within the space of ten weeks. The average rate of submission of lesson material was better than two assignments completed in a week.

According to an unofficial comment from the correction service in the correspondence bureau at the Rutgers Extension Division, the celerity and despatch of the efforts of this group were more than equalled by the excellence of their work. The average grade awarded them was considerably in excess of the average for the entire student body of the gas course.

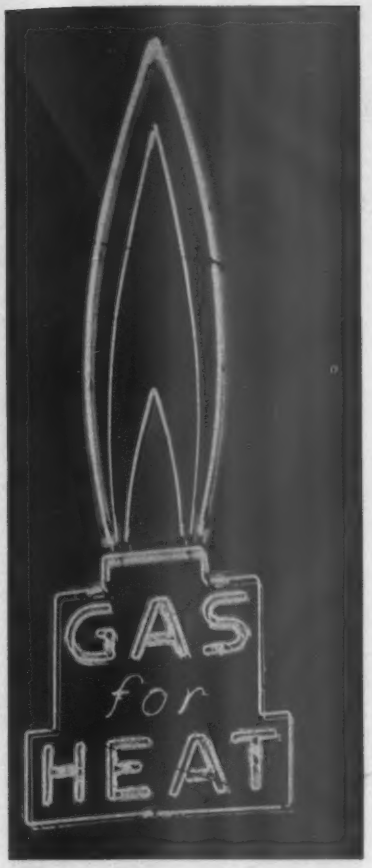
The achievement of the Public Service group in the gas course is a worthy continuance of the record established by a group from the Manufacturing and Distribution Departments of the same company in the previous year. That section, too, distinguished itself among the students of the country by its exceptional attainments and, like the 1932 section, organized itself spontaneously into a study group for the more effective pursuance of its training.

John M. Orts Succeeds Mr. Van Brunt

JOHN M. ORTS has been appointed director of the safety educational department of Public Service Corporation of New Jersey. He succeeds Allison J. Van Brunt whose death occurred April 5. Mr. Orts had been assistant to the director of safety education since 1926.

Mr. Orts is a member of the National Safety Council, American Society of Safety Engineers and the Newark Safety Council. He has instructed thousands of Public Service employees and members of police and fire departments in many New Jersey cities in the prone pressure method of resuscitation.

Illuminated Sign



THIS new illuminated sign now adorns the 125th Street Sales and Business Office of the Consolidated Gas Company of New York. It is about ten feet high.

Philip T. Dashiell Awarded Clark Medal

AT the Medal Day exercises of The Franklin Institute of the State of Pennsylvania, held in the Hall of the Institute, in Philadelphia, May 18, fifteen honors which had been awarded during the Institute year were presented to their recipients or representatives of them. The medalists were drawn from two foreign countries as well as from the United States.

Among those to receive honors was Philip Thornton Dashiell, of The United Gas Improvement Company, Philadelphia, who was awarded the Walton Clark Medal, in recognition of his outstanding contributions to the carburetted water gas industry as embodied in his fuel oil carburetion process.

The Clark Medal was founded in 1926 by The United Gas Improvement Company, in honor of Dr. Walton Clark, former chief engineer of that company and for many years president of The Franklin Institute.

British Gas Engineers Accept A. G. A. Invitation To Visit America For 1933 Meeting

A large group of British gas executives and engineers will visit the United States and Canada next year for a tour of the two countries and to attend the annual convention of the American Gas Association. This announcement was made by President R. W. Gallagher, who, with Hugh McNair, of Winnipeg, president of the Canadian Gas Association, extended an invitation to the British to visit America.

J. R. W. Alexander, secretary of the British Institution of Gas Engineers, has advised Association headquarters that the Council of his organization, in accepting the invitation, plans to be here in September and October, 1933, with numerous gas men from England, Scotland, Ireland and from the Continent, in many cases accompanied by their wives.

Deep interest in every phase of the gas industry in America, its history, developments and achievements, its rate forms and industrial growth, and use of natural gas, was noted by President Clifford E. Paige and Managing Director Alexander Forward during their visit to the annual meeting of the Institution in London in June, 1931. According to Secretary Alexander, the members are looking forward with enthusiasm to their visit.

While the event is more than a year away, preliminary arrangements already are being made by leaders of the gas industry of the United States and Canada to receive and entertain the visitors.

Gas Company Has Attractive Float

Picture of The Bridgeton Gas Light Company float in the Blossom Time Parade held at Bridgeton, N. J.

H. L. Doherty Speaks Over Moonbeam to His Organization

In Birthday Address At Opening of New Building Gives Views on Business Outlook

SPEAKING for the first time over the cold ray of a harnessed moonbeam, no thicker than an ordinary lead pencil, and having the energy of only two ten thousandths of a watt, science's latest achievement, Henry L. Doherty, founder and president of the Cities Service Company, on the night of May 13, from his office on the sixty-seventh floor of the new Sixty Wall Tower Building, in lower Manhattan, New York, sent a message of greeting by way of the National Broadcasting Company's network to the members of the Doherty Men's Fraternity, located in almost every city and hamlet throughout the United States and to the officers and men in the crews of the company's vessels plying the seven seas. Over the same moonbeams he blew a whistle which tripped a relay, causing the floodlights to shine on the new building.

For many years scientists have been experimenting, trying to find some way to utilize the light beams of the moon but not until the instruments developed by L. W. Chubb, director of research, Westinghouse Electric & Manufacturing Company, at the laboratories at East Pittsburgh and used for the first time in Mr. Doherty's celebration by Dr. Phillips Thomas, research engineer, and K. A. Ohlinger, optical expert of the Westinghouse organization, that the cold rays of the moon were controlled and put to work.

To carry out the demonstration, Dr. Thomas placed his moonbeam condenser on a balcony on the sixty-seventh story of the new building. The moon, at 8:50 P.M. summer time, was in its first quarter, in the south, a little west, just over Governor's Island at about 55 degrees above the horizon. The light from the moon, more than 230,000 miles away, was gathered with a lens 14 inches in diameter and focussed through a 21-inch cone to a tilted vibrating galvanometer mirror 1/8 inch in diameter which in turn projected the moonbeam about the size of an ordinary lead pencil on to the cathode of a photo-tube or "Electric Eye." To the vibrating mirror was attached a microphone and broadcasting amplifier so that when Mr. Doherty spoke, his voice vibrated the moonbeam focused on the mirror, thereby causing the pencil of moonbeam 4½ inches in length to dance on the cathode of the photo-tube passing the voice sounds as in talking pictures through the amplifier connected to the output attached to the photo-tube and from there to the radio listeners throughout the world. When he blew the whistle, to turn on the floodlighting system, a sound-sensitive relay responded to the signal and tripped the switch, causing the tower of the building to be illuminated.

Sixty Wall Tower.

The occasion for the demonstration was Mr. Doherty's sixty-second birthday, the official opening of the company's new building and also the opening of the March-of-Progress Exposition which is being held on the ground floor of the new structure.

With Mr. Doherty, during the demonstration, were Mrs. Doherty, Miss Helen Lee Doherty, W. Alton Jones, vice-president, Cities Service Company, M. H. Aylesworth, president R.K.O. and National Broadcasting Company, and Dr. Thomas and Mr. Ohlinger of the Westinghouse organization while more than 2,000 Cities Service employees were listening to the ceremony over the radio in various offices throughout the building.

Starting at 3:30 o'clock in the afternoon, this unusual birthday party continued into the evening. Thousands of visitors streamed through this latest addition to New York's world-famous skyline. Luncheon was served at noon preceding the inspection of the building and the regular Friday evening broadcast of the Cities Service hour, over the National Broadcasting System, was brought to those in the building by a public address system. The day's festivities closed with the turning on of the floodlighting system.

Sixty Wall Tower Building is the third largest office building in the world. It is 67 stories high and covers an area of 32,000 square feet. It will have a population of 8,000 people. It has been estimated that with the 23 elevators and five pairs of reversible esculators, in any emergency, the building could be emptied in 35 minutes. The estimated value (1929) of the building is approximately $38,000,000.

In his "Birthday Address," Mr. Doherty, among other things, said:

"In returning to active business at this time, I am not deceiving myself that the difficulties which have beset the paths of nearly all American business men are a thing of the past. I can see a sea of troubles for the whole business world for some time to come but I want to go out and meet these troubles and not dodge them. I am neither overconfident nor am I in any degree defeated. I expect no cure for the nation's business problems from any magic wand but I believe hard work and common sense are bound to win.

"This is my first visit to my office and will be my first visit to my home in nearly six years. My home is at 24 State Street on the top of the Battery Park Building just back of the United States Custom House, and facing out to the west on the Hudson River, to the south on the New York Bay and with the Statue of Liberty in view from all the south and west windows. A delightful home with the most inspiring view in all the world, but hardly the location to insure any degree of peace and quiet to a man who has spent nearly a half a century in active and eventful business life, of which more than one-third of a century has been spent with headquarters in the heart of the Wall Street district.

"It would be bad form for me to indulge in fulsome praise of the four men who have volunteered to sponsor my return to active business, but at least a passing reference is appropriate, although none of these men needs any introduction by me or by anybody else. I can, however, say a word or two about each that may be of some interest.

"Mr. George B. Cortelyou has been an outstanding public figure for many years and while the younger men may not have known him or have known of him when he held important offices in connection with our national government, they all know him as the head of the Consolidated Gas Company, which, in turn, is the parent company for most of the gas and electric companies in and around New York. I could say much in praise of Mr. Cortelyou but I will not say anything more than that he stands for one thing in which I am a thorough believer. I believe every man of every industry should try and make that industry sound and safe for the people of the industry and all of its stockholders and all of its customers. We never had peace in the gas industry for practically forty years and when we did secure a truce between all of the warring factions, it was George B. Cortelyou we chose without opposition as the president of the National and combined organization that we then formed.

"Mr. Joseph P. Day comes next in the alphabetical list of names and he too has never failed to work unselfishly for the department of business in which he is nationally and even internationally known. No name ranks higher than that of Joseph P. Day in the real estate world and he has plenty of work before him in the present emergency in his field of business and I will underwrite the fact that he will contribute much to the problems which confront his division of the business world.

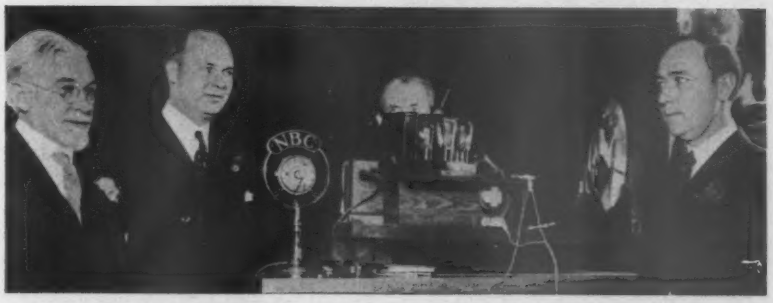
"Mr. A. W. Robertson, chairman of the board of the Westinghouse Electric and Manufacturing Company, has by past performance and promotion earned a position which entitles him to the confidence of the business world and the right to carry on the work of that great pioneer, Mr. George Westinghouse, and the many wonderful men who have helped build up the Westinghouse Company. We of our organization know Mr. Robertson and his work and we have no hesitation in rating him as a splendid executive.

"Last but far from least comes Mr. Walter C. Teagle. By virtue of his position as the head of the biggest oil corporation in the world, he is the recognized leader of the petroleum industry, but his position with the men of the petroleum industry does not depend upon his position but would be assured simply based on the friendship and admiration the men of the industry have for him.

"An important man of the business world with a heavy load on his shoulders recently consulted with me about some of his plans for the business which he heads and told me his plans and asked me what I thought of them, and I told him that the average business corporation was at this time much like a chip on the ocean,—that it did not make much difference what the chip did but it did make a lot of difference what the ocean did.

"I believe our present educational methods are responsible for much that is wrong with us. Many children are started in the kindergarten and are carried through the higher schools until they graduate from the university, being taught to absorb and believe everything that they are told, and they have it fed to them so fast that they never have an opportunity to ponder and weigh in their own minds what is true and what is not true, or acquire a sense of the relative importance of things. Few of them ever learn to refuse to accept anything as being true except in a tentative way until they

Rays of the Moon Harnessed to Carry Human Voice



Shown in the photograph, left to right, Henry L. Doherty, W. A. Jones, vice-president Cities Service Company, Dr. Thomas, operating moonbeam controller, and H. M. Aylesworth, president, National Broadcasting Company.

prove its truth by their own methods. We turn them out of our schools filled with what passes for an education, but except for the professional and occupational courses, practically untrained to do any useful thing in life. We take 16 years or more to educate them and then turn them loose and expect them to get their vocational training by chance. By far the most useful thing in an ordinary academic college education is the awe it inspires on the part of others. Perhaps I could hold up the older Mr. J. P. Morgan as one of the most successful business men that this country has ever produced, and I doubt seriously that he ever had occasion in his important business conquests to use any of the knowledge that was acquired above the grammar grade of the ordinary school.

"At 22 I believed that all of our industries and all of our institutions must be, through long years of refinement by experience, in almost perfect condition, but, at 62, I look upon many of these industries and institutions as having been a pitiable mistake in their conception and the many years of experience were expended on trying to improve something which was basically wrong to start with.

"I hope to devote much of my remaining days to teaching the grandeur of the things which are regarded as commonplace and to endeavor to make things that are now complex seem simple and by my work to inspire others to first see and then improve upon my viewpoints and to carry on and to improve my methods. The tendency today seems to be to see how involved and complex we can make things.

"I don't think I have any delusions in the seriousness of the situation that confronts us in the political, financial and industrial world, and I have no notion that there is any immediate panacea for our ills but, nevertheless, at 62 I am confident and undaunted.

"I have abundant proof of the fact that I foresaw the boom which had its collapse in 1929 and a serious period of reorganization which I knew we were bound to face, but I must say that I have been astonished at the things that have happened since the bubble broke and am apprehensive regarding the wisdom of the steps that may be taken to recover our economic balance.

"We have been living under more or less artificial conditions for nearly 20 years. Natural laws have at times only exercised a remote and a small degree of control. It is no wonder that we have ceased to respect these laws as we should and no great wonder that many of the younger men have never learned how these natural laws work and that we should now have a vast number of people who govern their actions almost entirely on the effort to diagnose existing conditions and future happenings by a study of mob psychology.

"Surely, never since the close of the war have we had either natural or normal business conditions. We have had two major booms and two panics, —one of which we are still in, and the one we are now in we hope is near its end, but nevertheless, we don't know when it will end, but we do know it will end.

"The two booms produced two new crops of millionaires and business executives and naturally some of them were mere accidents and the two depressions wiped out many sane and able business executives and carried down what should have been solvent people and solvent institutions.

"During the latter part of the war, the price of oil was fixed at $2.25 a barrel. As soon as governmental control was released, the price advanced and bounded up to $3.50 a barrel but during the early part of 1921, it was cut successively until the price was a dollar a barrel. Our own company found itself facing a diminished revenue of upwards of $100,000 a day.

"Between the period of 1925 and 1929, I frequently discussed with my own associates, first the possibility of a boom and then the reaction, and then the realization that the boom had come and the inevitable reaction from it. All of our people thought we were conducting ourselves so we need have no fear of a reaction from the boom and I have often heard our men rehearse during 1928 and 1929 the many safeguards that we had set up. None of us dreamed that only a short time would elapse when we would see distressed oil selling as low as 5 cents a barrel, and none of us realized that we would have soldiers standing over our biggest oil pool and that we would not be permitted to produce a barrel of oil from this pool for a period of approximately 60 days, and a somewhat similar condition in another State.

"I was accused repeatedly by other business men of being a moss-back, of being ultra conservative and perhaps even of business cowardice, but I certainly never thought that we would ever reach 5 cent oil, 6 cent cotton, 25 cent wheat and eggs at a cent a piece or less.

"Our whole plan or lack of plan of government has become too complex for any human mind to master. Every new State or Federal law adds to the complication, and yet every year unnumbered new laws are passed and the number of laws that are proposed would require the destruction of whole forests to produce the paper on which they are printed.

"Having gotten ourselves into unnatural and artificial conditions, we cannot avoid the necessity of exercising a certain degree of control even if we were all determined to get back to the simplest form of government whereby each citizen can control his acts in accordance with natural laws. We must evolute, not revolute, but we must be sure we are evoluting in the right direction.

"It is my belief that in this great country of more than 125,000,000 people, it would now be harder to find

Mr. Doherty Honored By N. Y. Business Men

HENRY L. DOHERTY, at a luncheon given in his honor in New York, May 13, by prominent business men, displayed all his old time vigor in a speech replete with challenges to educational, political and economic practices of the day.

The luncheon, at which George B. Cortelyou, Joseph P. Day, Andrew W. Robertson and Walter C. Teagle were hosts, was attended by about 200 industrial leaders. It marked Mr. Doherty's return to active participation in the administration of Henry L. Doherty & Company and Cities Service Company, after six years of ill health. Mr. Cortelyou acted as toastmaster.

ten men who understand the theory and science of government than it would have been to find an equal number of men in the small group of those who composed the Constitutional Convention that sat in Philadelphia in 1787. The reason for this, I believe, is a simple one. For more than a generation the minds of all the people of these Colonies had been on the subject of government. They wanted to get away from a form of government where they were subjected to the caprice of the monarch or the selfish motives of those who surrounded the monarch. They all wanted, consciously or unconsciously, to set up 'rules of the game' that would govern and not be subjected to the caprice of any one person or group of persons. The intelligent and responsible citizens of that period finally realized that for their own protection they had to set up a government and do everything they could to strengthen and support that Government so it in turn could support and protect them. And this they did.

"As the Government got stronger it became the custom not to study how the citizens could support the Government but how the Government could support the citizen, and all of our Governments now—State and Federal—are preyed upon by selfish people, and few citizens feel any responsibility for their proper conduct. Everybody who has any sort of a selfish interest, even though it is simply that of a desire for publicity, does not hesitate to do that which carries us further away from creating a more perfect Government.

"These statements may sound like many statements that have heretofore been made, and oft-repeated statements become as meaningless to most people as when anybody sees a parrot they say, 'Polly wants a cracker?' and yet they don't know whether they are asking a question or what they are saying and the last thought in their mind is to go and find a cracker and give it to the parrot.

"The growth, number and variety of our Governmental functions are reaching alarming proportions and everybody is always suggesting some new or extended government activity. Specifically our people have no confidence in politicians, and yet they have somehow a tremendous opinion of what it is possible for the government to do. We not only hear continual suggestions of added Government activities but it is almost an every-day occurrence to hear someone suggest an Amendment to the Federal Constitution and yet it is perfectly apparent that they do not know what is in the present Constitution or the plan of government which is provided by the Constitution.

"Unfortunately there are too many people ready to act on impulse and there are a world of people who are inclined to follow the man who shouts the loudest rather than the man who thinks the clearest. While our energies should be devoted primarily to meeting the present emergency, we should draw from this situation a lesson for our future and part of this lesson should be to simplify our form and ramifications of government and reduce its activities and to observe natural laws and the simple virtues that were observed by our forefathers, and especially that of thrift.

"In all of the enormous amount of matter written and spoken regarding the matter of unemployment everybody seemed to take it for granted that if men were thrown out of employment one day, they would have nothing to eat the next. In other words, the idea of universal lack of thrift seemed to be accepted as the proper way to live.

"I have spent a large part of my life trying to talk and preach thrift and its many advantages, but it seems to me that more and more people every year regard thrift as a matter to view with more or less contempt. If we were a thoroughly thriftless nation, which many people seem to think is our natural state—and that this should continue in the future—it is easy to see how if any one group of men are thrown out of employment for any special reason, their purchasing power immediately stops and they, in turn, perhaps bring about the unemployment of others, and a slight disturbance can cause a wave of unemployment to sweep the nation. While if reasonable thrift is observed, then men thrown out of employment temporarily can maintain their purchasing power until re-employed.

"The collapse of our boom was inevitable and a period of reorganization was essential. The reason we have not accomplished more has been due first to the fact that having lived for years on mob psychology, many people believed—that we could simply shut our eyes to the real condition and reestablish prosperity by a further resort to mob psychology. In other words, the serious mistake was to refuse to face the situation and to insist that every thing was all right or was soon going to be all right.

"The amount of money that had gone into foreign investments and the amount that had gone into real estate improvement even before the boom got well under way was enough for serious alarm.

"The second great difficulty has been that relief measures were neither applied in time nor adequate to the situation. It would be idle to attempt to discuss all of these matters here for this is merely a plea for accurate thought and sincerity of purpose and a warning against following those who recommend remedies that are not the result of careful, accurate and sincere planning.

"There is no question but what more than eight people out of ten believe that in an emergency of this sort all we need is a lot of money and all that is needed to have plenty of money is for the government to have a goodly stock of paper, ink and presses.

"The two vital things now to start us back towards normal conditions are wisdom in regard to taxation and wisdom regarding money, and unfortunately there are probably no two subjects on which there is less definite knowledge and more erroneous opinion.

"With all of our boasted culture and education, nobody, or no group of men, has ever developed the science of taxation, and yet taxation must have been practiced continually since long before any written history could be made. Up to the time we got into the European War, I think I purchased everything with any promise relating to taxation that had been published in the English language and had even paid to have some translations made and I could not even see a suggestion of the development of the science of taxation.

"Much of our taxation has been nothing less than vicious in effect and the examples most frequently cited to illustrate this point is the taxation once used in England, covering taxes on the area of windows and on every hearth,—in other words, taxes that tended to make for poorly heated, poorly lighted and poorly ventilated houses and hence handicaps to the welfare and good health of the Nation.

"If time would permit there would be no necessity to go back to taxes of this sort, for it could be readily shown how harmful and unwise some of the taxing methods are that have been used in modern times and right now I have seen no evidence in any of the discussions in Congress that those who advocate a heavy income tax and oppose a sales tax know some of the very vital reasons why the policy they advocate is unwise.

"We all know that we are going to have to pay an income tax but we don't know how much we are going to have to pay, therefore, everybody wants to keep their funds idle or else in short term investments, like our treasury bills, until they can figure how much of an income tax they will have to pay. The re-establishment of high rates on the income tax is going to cause a delay of many months in the ability of the industries that need money to create the conditions that will re-establish employment because there will necessarily have to be a re-shifting of billions of dollars of private investment. For instance, the people who now have a large income and have their money invested in industrial enterprises will be subjected to such a heavy income tax that they will be far better off to sell holdings of this character and in turn will buy municipal and other tax exempt securities. Only those having an income below the amount exempted can hold the type of securities which provide capital for employment without being penalized for doing so.

"The adoption of these income taxes will not only seriously delay the period when money will be available for the type of enterprise that furnishes employment on other than public works, but will make funds available only at such high interest rates that many industries will not be able to pay the price."

A. G. A. Employee-Customer Relations Course Price is Lowered

THE American Gas Association announces a substantial reduction in the price of the Employee-Customer Relations Course.

This Course, prepared for the Association in 1930, has been an outstanding success. Nearly eight thousand employees from gas companies in almost every State of the Union have received certificates for completion of the work. It has attracted wide attention in educational and industrial relations fields.

The new price is now possible because of lowered costs under present conditions and the discontinuance of the service of marking papers. The discontinuance of this service will not impair the value of the course as directions will be given for marking papers and for setting up the full service within the company. These directions will be furnished without charge to each company purchasing five or more sets of the text material.

Leaders' manuals also will be furnished free for the use of every company which purchases the texts for class use. The directions will be clear and explicit to insure success of the work.

The price at which the texts are offered is $5 for the six units. The return to the gas company is vastly greater than this investment of $5 per contact employee.

Earning power of a public utility depends in no small measure upon the esteem in which that utility is held by the purchasers of its products. Goodwill of the public is not a matter of chance, nor yet of executive policy alone. To the public, the policy of the company is represented by the acts and words of the employees, the real interpreters of the company to the people. The first indication of regard for customers that the management can show is in insuring a considerate treatment of those customers by all employees.

A matter of this sort cannot be left to luck. Definite provision must be made for training. The untrained contact employee may be a decided liability. He can be made into a dependable asset, but that requires definite effort in contact training. Such training is provided in the American Gas Association Course. Results have been achieved through its use in gas companies of the entire nation that have produced enthusiastic support for the plan.

Ours is a stable industry. Planning to strengthen that stability is a duty most surprisingly agreeable when it raises the morale of the employees while helping them improve public relations. That such results can be secured in the use of the A. G. A. Plan for Improvement of Employee-Customer Relations is abundantly testified by group leaders and executives of many companies in all parts of the land.

Any further information concerning the Course and enrollment blanks can be secured by addressing American Gas Association, 420 Lexington Avenue, New York, N. Y.

Prague Produces Nearly 36% of Total Czechoslovak Gas Consumption

ACCORDING to official statistics there were 84 gas plants in operation in Czechoslovakia during 1930, of which 16 were private enterprises, 67 plants were municipally owned, while one plant belonged to the Ministry of Railways, according to a report to the Department of Commerce from Assistant Trade Commissioner Sam. E. Woods, Prague, Czechoslovakia.

Total gas production for the year amounted to 115,092,000 cubic meters which was an increase of more than 6,000,000 cubic meters or about 5.5 per cent as against the preceding year. The gas works of the city of Prague alone produced 41,000,000 cubic meters which represents 35.7 per cent of the total gas output for the country in 1930.

P. U. A. A. To Meet In New York

The annual convention of the Public Utilities Advertising Association will be held in New York from June 19 to 23, according to an announcement made by R. S. McCarty, of Pittsburgh, Pa., president.

It is expected that nearly 250 public utility advertising men from all sections of the country will attend the convention, which will be held in conjunction with the annual gathering of the Advertising Federation of America, of which the public utility group is a department.

A feature of the convention will be the award of prizes for the best public utility advertisements appearing in newspapers during 1931, Mr. McCarty said. Prizes also will be given for direct mail, billboard, and poster advertising.

To Hold Joint Course and Conference At Laboratory, June 15-17

A COMBINED "Course in Gas Appliances" and a "Home Service Conference" will be held at the A. G. A. Testing Laboratory, Cleveland, Ohio, from June 15 to 17.

The two-and-a-half-day conference planned for this year is taking the place of the week's short course in Domestic Gas Appliances held in former years at the Laboratory. A shorter conference has been planned this year because of the conservation program of many organizations.

No registration fee will be charged this year.

This conference is sponsored by the Home Service Committee, the chairman of which is Miss Hulda Ungericht, Ohio Fuel Gas Company, Columbus, Ohio. Miss Ada Bessie Swann, of the Public Service Electric & Gas Company, Newark, N. J., is chairman of the Educational Subcommittee of the Home Service Committee and therefore is directly in charge of the course, assisted by F. R. Wright, Publications Editor, A. G. A. Laboratory, who has charge of the lectures by the Laboratory staff and of local arrangements.

This course is open to any one interested. While it has been planned particularly for those employed in home service work yet it should be of interest to those responsible for merchandising results and those interested in distribution and operation.

The tentative program, subject to revision, follows:

WEDNESDAY MORNING, JUNE 15

Miss Hulda Ungericht presiding—Chairman, Home Service Committee

Remarks by Home Service Committee Chairman.

Story of the Laboratory—R. M. Conner, director, A. G. A. Laboratory.

Laboratory Testing Policies—F. R. Wright, publications editor, A. G. A. Laboratory.

Laboratory Units.

What Home Service Workers Need to Know About Gas—Dr. F. E. Vandaveer, Supervisor, A. G. A. Laboratory.

Central Heating Appliances and Controls—Wm. Smith, testing engineer, A. G. A. Laboratory.

Building Greater Load Through Home Service—Hugh Cuthrell, manager, new business department, Brooklyn Union Gas Company, Brooklyn, N. Y.

LUNCHEON

A. G. A. Testing Laboratory.

WEDNESDAY AFTERNOON, JUNE 15

F. R. Wright, Director of Laboratory Course, presiding.

Gas Range Thermostats and Time Controls—W. R. Teller, Research Engineer, A. G. A. Laboratory.

Gas Ranges—C. S. Stuckenholt, Laboratory Foreman.

Practical Work on Adjustments.

DINNER—JUNE 15

Hollendon Hotel—6:30 P.M.

Miss Hulda Ungericht, presiding.

SPEAKERS

Miss Katharine Fisher, Director of Good Housekeeping Institute, New York, N. Y.

Mr. R. W. Gallagher, President, American Gas Association and President, East Ohio Gas Company, Cleveland, Ohio.

Mr. Earle W. Hodges, Director of Public Relations, Henry L. Doherty & Co., New York, N. Y.

THURSDAY MORNING, JUNE 16

Miss Ada Bessie Swann, presiding.

Remarks by Chairman.

Home Service Trends—Elsie Hinkley, Tappan Stove Co., Mansfield, Ohio.

Discussion—Karen Fladoes, Equitable Gas Co., Pittsburgh, Pa.

Load Value of Home Contacts—E. M. Tharp, Asst. General Manager, Ohio Fuel Gas Company, Columbus, Ohio.

Discussion—Hulda Ungericht, Ohio Fuel Gas Co., Columbus, Ohio.

Discussion from floor.

Contacts with Women's Clubs—Mrs. Ella Liner Lambert, Milwaukee Gas Light Co., Milwaukee, Wis.

Discussion—Mrs. Jean Haas, Kings County Lighting Co., Brooklyn, N. Y.

Discussion from floor.

Home Service and Advertising—Keith Clevenger, Director of Publicity and Advertising, American Gas Association, New York, N. Y.

Discussion—Miss Clara Zillessen, Advertising Manager, Philadelphia Electric Co., Philadelphia, Pa.

Discussion from floor.

Load Value of Kitchen Planning—Ruth Kleinmaier, Central Hudson Gas & Electric Corp., Poughkeepsie, N. Y.

Gas Refrigeration—H. S. Boyle, Sales Promotion Manager, Electrolux Refrigerator Sales, Inc., New York, N. Y.

LUNCHEON

A. G. A. Testing Laboratory

THURSDAY AFTERNOON, JUNE 16

Miss Ada Bessie Swann, presiding.

Water Heaters—F. H. Rutherford, Testing Engineer, A. G. A. Laboratory.

Domestic Competition.

1. *Comparison of Gas and Electricity*—K. R. Knapp, Chief Engineer, A. G. A. Laboratory.
2. *Surmounting Domestic Competition*—Speaker to be announced.
3. *Discussion*—Mrs. Bernice Bowser, Bowser Service Corp., New York, N. Y.

How Variables in Different Forms of Gas Effect Appliances: Portable Gas, Butane Air, Natural and Manufactured Gas—W. P. Cook, Research Engineer, A. G. A. Laboratory.

Sight Seeing Tour Around City or Picnic.

FRIDAY MORNING, JUNE 17

Miss Ada Bessie Swann, presiding.

Group Appliances (15 minutes to each). *Incinerators, clothes dryers, space heaters*—K. H. Flint, Chief Inspector, A. G. A. Laboratory.

Merchandising Gas Appliances—Speaker to be announced.

Discussion—Bernice Bowser, Bowser Service Corp., New York, N. Y.

Flues and Ventilation—John Corsiglia, Asst. Chief Engineer, A. G. A. Laboratory.

Resume of Course—Ada Bessie Swann, Public Service Electric & Gas Co., Newark, N. J.

Problems Met in Saturation Measurement and Control In Gas Lines*

include footnote

MUCH has been written concerning the practical benefits of both oil spray and moisture injection into dry natural gas that may be distributed in pipe lines formerly used for manufactured gas. The dry gas absorbs moisture and condensible hydrocarbons with which the packings and meter and regulator diaphragms may have been saturated when the pipe lines distributed manufactured gas. This removal of the moisture and condensible hydrocarbons results in leaky joints and deteriorated diaphragms. The purpose of oil and moisture addition to a dry gas is to build up the vapor pressure of the moisture and hydrocarbons to such a degree that the leaks through packing will be reduced, that meter diaphragms do not deteriorate and that dust tending to clog up domestic appliance will be avoided.

*Paper read before the A. G. A. Natural Gas Department Annual Convention, Tulsa, Okla., May 11, 1932.

By W. W. Frymoyer

Director of Research,

The Foxboro Company

The problems arising in oil spraying will not be discussed in this paper.

By per cent saturation or relative humidity is meant the ratio of the actual amount of moisture in a cu.ft. of gas at some temperature to the amount of moisture that a cu.ft. of the same gas will hold at the same temperature when saturated. The problems in Saturation Control may be divided into two quite related parts: the first connected with the degree of saturation and the second with the saturation control, showing how it is affected by temperature variations, pressure variations and by methods of injecting the moisture.

Measurement Methods

In the control of any physical quantity it is always assumed that some method exists that makes it possible to either directly or indirectly measure the variations in the magnitude of the physical quantity. Since degree of saturation is a ratio it is necessary to measure or to have available the actual moisture content as well as the standard of moisture content to which it is to be compared. Actually there is no method of measuring this ratio except indirectly. The standard of measurement to which all other methods are compared consists in actually removing by drying and weighing the moisture contained in a known volume of gas. The moisture so determined is compared with the quantities corresponding to saturation given in Table I. This method requires elaborate laboratory apparatus and careful manipulation to insure reasonable accuracy. It is utterly unsuitable for control purposes or field work.

Dew Point Method

The Dew Point Method likewise requires elaborate precautions to insure accuracy and therefore is only suitable for use in the laboratory. This method consists in measuring the temperature at which condensation occurs

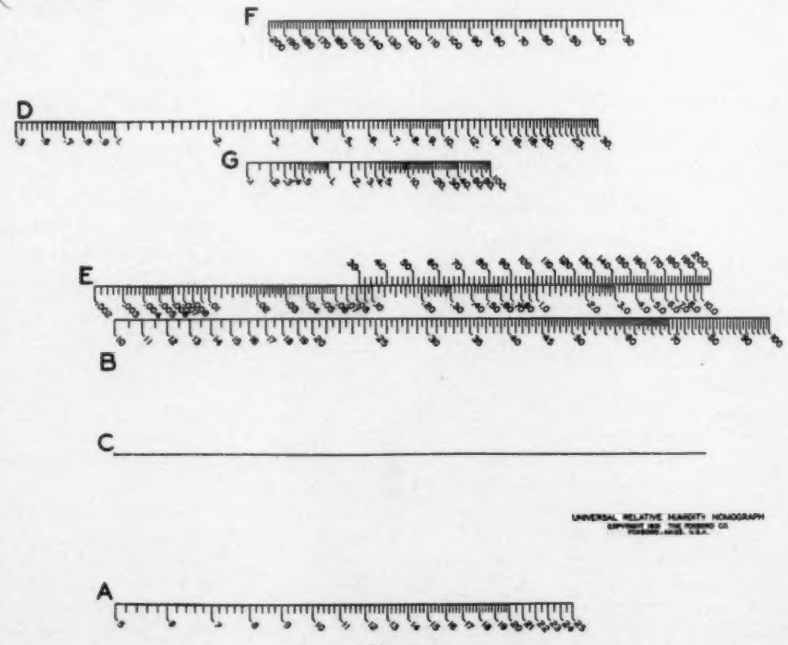


Figure 1

TABLE I

T = Temperature in deg. F.
P = Pressure in lbs. per sq.in. absolute.
V = Specific volume in cu.ft. per lb.
d = Density in lbs. per cu.ft.
h_g = Total heat of vapor at temp. B.t.u. per lb.
h_f = Total heat of liquid at temp. B.t.u. per lb.

DATA FROM KEENAN'S STEAM TABLES

T	P	V	d	h_f	h_g
35	.1000	3,301	.000303	3.0	1,075
40	.1217	2,445	.000409	8.	1,077
45	.1475	2,037	.000491	13.	1,079
50	.1780	1,705	.000587	18.	1,082
55	.2140	1,432	.000698	23.	1,084
60	.2561	1,208	.000828	28.	1,086
65	.3054	1,023	.000978	33.	1,089
70	.3628	869	.001151	38.	1,091
75	.4295	741	.001350	43.	1,093
80	.5067	634	.001578	48.	1,095
85	.5960	544	.001838	53.	1,098
90	.6980	469	.002134	58.	1,100
95	.8149	409	.002469	63.	1,102
100	.9487	351	.002851	68.	1,104
105	1.1009	305	.003279	73.	1,106
110	1.274	266	.003759	78.	1,109

in partially saturated gas. The temperature of a carefully polished body is slowly dropped until condensation occurs. The vapor pressure at this temperature is the partial pressure of saturation. By referring to Table I this vapor pressure may be read. Since the mass of the moisture in a partially saturated gas bears the same relation to the mass of moisture at saturation that the vapor pressure at the dew point does to the saturation pressure at the gas temperature, the relative humidity may be determined. In this method the apparatus on which condensation occurs must be carefully polished, must be clean of all film and particles of dirt, the temperature must be very slowly reduced to avoid persistence of the vapor phase below the true condensation temperature and vibration must be avoided for consistent results. However, it is practically independent of pressure and gas analysis.

The Wet and Dry Bulb method probably furnishes the most practical means for determining relative humidity in spite of the many variables that enter into the method. This method consists of measuring the actual gas temperature with the "dry" bulb; forcing gas at some velocity over another temperature sensitive bulb covered with a wick or porous sleeve or other means to furnish moisture for evaporation. The unsaturated gas in passing over the wet bulb absorbs more water whose heat of vaporization produces the wet bulb depression. Now the moisture that may be added to the passing gas depends on the quantity of moisture already in the gas. The amount of this cooling effect therefore varies directly as the quantity of moisture which can be added. If the gas increases in pressure, the gas density increases; likewise the heat required to change a given volume one degree increases. This change in heat capacity produces variations in the amount of cooling produced by the heat of vaporization. In other words, when the heat of vaporization remains constant the cooling decreases if heat capacity of gas increases. In a similar manner different gases with different heat capacities produce variations in this cooling. For instance, if the analysis of the gas should change so as to increase its heat capacity, the depression of the wet bulb for a given relative humidity then would be less.

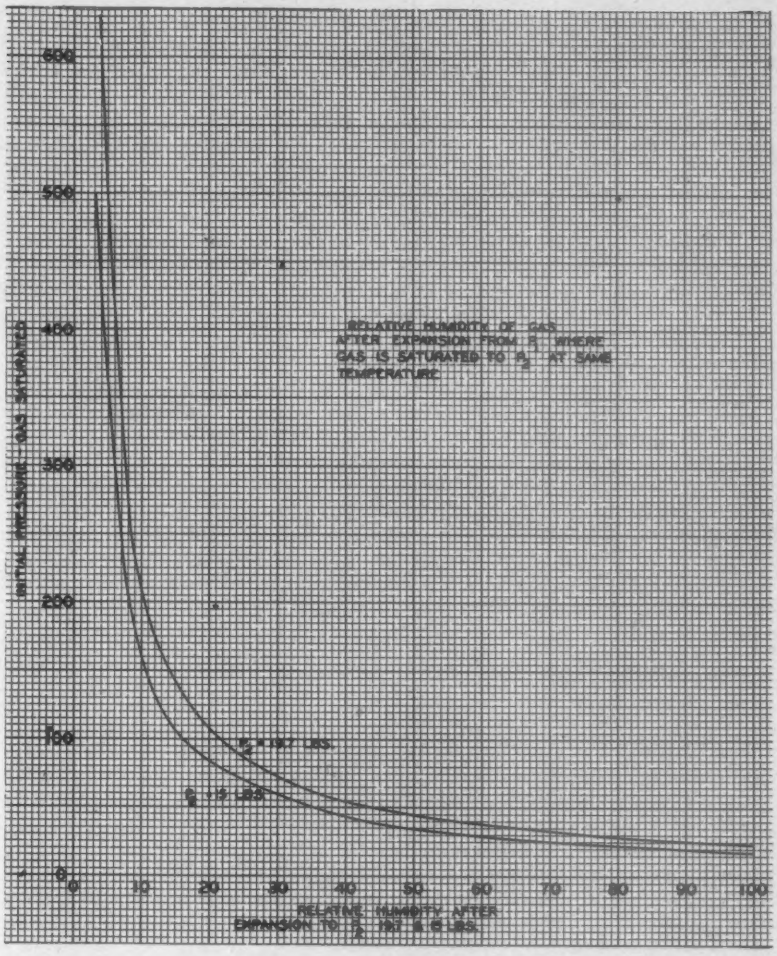

INITIAL PRESSURE GAS EXPANDED
RELATIVE HUMIDITY OF GAS AFTER EXPANSION FROM P_1 WHERE GAS IS SATURATED TO P_2 AT SAME TEMPERATURE
P_1 = 197 LBS.
P_2 = 25
RELATIVE HUMIDITY AFTER EXPANSION TO P_2 INT. & G. LBS.

Figure 2
All pressures in pounds per square inch

Now in gases the heat capacity varies considerably with the gas analysis. For a given volume of gas this variation may be expressed as the product of the molecular weight and the specific heat at constant pressure. Just how this factor may be used to actually determine the dew point temperature varies with the method of analyzing the problem of the cooling effect. Very little experimental work has been done on the subject with other gases than air. The data given in Tables II and III has been taken from the Weather Bureau data on the subject for air.

The best and most workable equation for vapor pressure of dew point is: (E. Buckingham suggested this approximate equation)

$$E = E_w - .000053\, CB\, (t_a - t_w)$$

where E = Vapor Pressure of Dew Point inches Hg.
E_w = Vapor Pressure corresponding to Wet Bulb and Temperature
C = Molar Constant of Gas
B = Absolute Pressure in inches of mercury
t_a = Dry Bulb Temperature Deg. F.
t_w = Wet Bulb Temperature Deg. F.

Relative Humidity is expressed: $\frac{E}{E_a}$ when

E_a = Vapor Pressure corresponding to dry bulb in inches of mercury.

Fig. 1 is a nomogram which solves the foregoing equation graphically except that B, E, E_a and E_w are in lbs. per sq.in.

In operating the nomogram it is necessary to know the value of C for the particular gas under consideration. Table V gives the C value for different gases. The C value for any com-

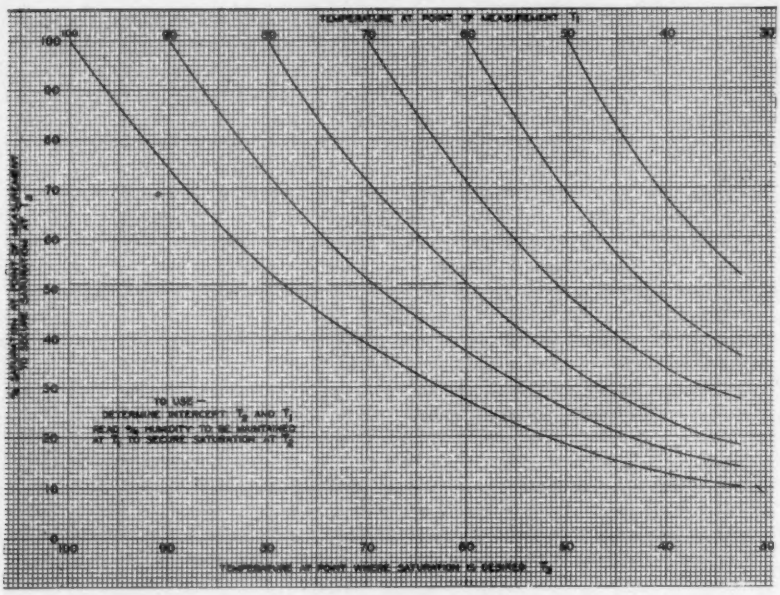


Figure 3

pound of these gases may be determined by multiplying the per cent of the various gases by the respective molar heat values. The sum of these products divided by 100 gives the C value for the compound. For example the C value for a gas of the following composition may be determined as follows:

A *% of Volume*	*B* *Gas*	*C* *Molar Heat Constant C*	*Product* $A \times C$
1.5	CO_2	8.9	13.4
3	O_2	7.0	21.0
3.5	N_2	7.0	24.5
45.1	H_2	6.9	310.0
31.4	CH_4	8.6	270.0
8.6	CO	7.0	60.2
6.9	C_2H_4	11.8	81.5
100.0			780.6

$$\frac{780.6}{100} = 7.81 = \text{Molar Heat Constant}$$

To determine the relative humidity or per cent saturation of a gas of the foregoing composition at 5 lbs. per-sq.in. line pressure, 14.7 lbs. per sq.in. barometer, 70° F. dry bulb temperature and 62° F. wet bulb temperature, proceed as follows: place a straight edge between 7.81 on the A scale and 19.7 (absolute pressure) on the B scale. Place the straight edge between the intercept on the C scale and the difference between the wet and dry bulb temperatures (8°) on the D scale. The value .066 on the lower E scale is the vapor pressure value of the molar constant correction factor (C).

Place the straight edge between the wet bulb temperature (62°) on the upper E scale and the dry bulb temperature (70°) on the F scale and on the C scale read 75%.

Place the straight edge between the value .068 on the lower E scale and the dry bulb temperature (70° F.) on the F scale and read 19% on the G scale.

The difference between 75% and 19% is 56%, which is the per cent saturation or relative humidity of the particular gas in question at 19.7 lbs. per sq.in. absolute. If air has been under a pressure of 5 lbs. per sq.in. with the wet and dry bulb temperatures the same as before, the value taken on scale A would be 7.0 which is the molar constant for air; the value found on the lower scale E would be .06 and on scale G 16. The difference between 75% and 16 is 59 which is the relative humidity of air under the foregoing conditions.

Another method of utilizing wet and dry bulb readings is by the use of Glaisher's Values A in the equation.

$$t = t_a - A(t_a - t_w)$$

where t = dew point temperature in deg. F. or C
t_a = dry bulb temperature
t_w = wet bulb temperature
A = Glaisher's Factor

These factors apply only to air. However, experimental values may be derived for other gases which may be used as multiplying factors applied to the Glaisher's Factor A. This method has been used in England with considerable satisfaction.

Any of these methods will give the dew point temperature by means of which the relative humidity may be determined by the equation

$$\text{Relative Humidity} = \frac{E}{E_a}$$

There are other means frequently used for saturation control that do not measure the true conditions of saturation but are dependent on the initial condition of the gas saturation. Among these may be listed the heating effect of the steam injection or the cooling effect of the water spray. Inasmuch as these methods are intimately connected with control itself, they will be discussed under problems connected with saturation control.

Problems Connected With Saturation Control

The vapor pressure of moisture contained in most gases that are not chemically attracted by water is practically independent of pressure when the gases are saturated with moisture. Now if the gas saturated at a low pressure is compressed, the vapor is compressed to a higher pressure with no change in temperature. However, if this new vapor pressure tends to become greater than the vapor pressure of water vapor corresponding to the temperature existing in the gas the excess moisture condenses. Conversely the vapor pressure is reduced when gas saturated at a high pressure expands. This decrease in moisture is graphically illustrated in Fig. 2, from data in Table VI. Furthermore, when a gas expands a cooling effect occurs due to the fact that some potential energy has been converted into work. These two facts make it necessary to make all temperature measurements, whether wet or dry bulb, in the same gas at the same pressure and temperature.

Many of the problems arising in saturation control can only be satisfactorily presented by actual solution of these problems in physics. These problems will be presented in the form of questions and answers.

Question 1. How much heat is required to raise the temperature of 1,000 cu.ft. of dry gas of the following analysis, 5 lbs. per sq.in. gauge pressure and 14.7 lbs. per sq.in. barometer from 70° to 71° F.?

CH_4	95 %
C_2H_6	2.5%
N_2	2.5%

Solution 1. (a) The density of air when the barometer is 29.92" Hg. and temperature is 32° F. = .0807 lbs. per cu.ft. The density of air at 70° F. by Charles Law is as the inverse ratio of the absolute temperature or

$$\frac{32+460}{70+460} \times .0807 = \text{density at } 70° \text{ F.}$$

or .0749 lbs. per cu.ft.

(b) By Boyle's Law the density varies directly as the absolute pressure. Now the density at 70° F. and 5 lbs. per sq.in. gauge 14.7 lbs. per sq.in. barometer can be determined from (a) by multiplying

$$\frac{14.7+5}{14.7} \times .0749 = .1005 \text{ lbs. per cu.ft.}$$

(c) The specific heat of air at constant pressure C_p — .2375 B.t.u. per lb. Therefore, the heat required to heat 1 cu.ft. of air 1° F. at 19.7 lbs. per sq.in. absolute and 70° F. = (b) $\times C_p$ or

$$.2375 \times .1005 = .2039 \text{ B.t.u.}$$

(d) The molar heat value for a gas takes both density and specific heat into consideration. The data given in Table V may be used to determine relation between the heat required to heat 1 cu.ft. of gas as compared with air. To secure the molar heat value for gas of the analysis specified would give

Gas	%	C	
CH_4	95	8.6	= 817
C_2H_6	2.5	11.8	30.0
N_2	2.5	7.0	18.0
			865.

$865 \div 100 = 8.65$

Molar heat value for air = 7.00

(e) Under (c) heat required to heat 1 cu.ft. of air at 19.7 lbs. absolute and 70° F., 1° F. = .0239 B.t.u. But this gas has a ratio to this value of $\frac{8.65}{7.00}$ or B.t.u. required to heat this particular gas 1° F. $= \frac{8.65}{7.00} \times .0239$ = .0295 B.t.u.

Now the heat required to heat 1,000 cu.ft. would be $1{,}000 \times .0295 = 29.5$ B.t.u.

Question 2. Assuming the gas in question one is 10% saturated, what rise in temperature will be produced by the injection of sufficient steam, from 10-lbs. gauge pressure, to produce saturation?

Solution 2. (2a) Since the saturation pressure of water vapor at 70° F. is .3628 (see Table 1), vapor pressure at 10% saturation is .03628. In view of the small magnitude of this pressure as compared with 19.7 lbs., the full pressure of the gas, the vapor may be neglected in determining the gas density and the molar heat.

TABLE II

TABLE OF RELATIVE HUMIDITY OR PER CENT OF SATURATION FOR AIR AT 14.7 POUNDS PER SQ.IN. BAROMETER

Dry Bulb Deg. F.	Difference Between Readings of Wet and Dry Bulbs in Degrees Fahrenheit																															Dry Bulb Deg. F.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	22	24	26	28	30	32	34	36	38	40	45	50	55	60	70	
30	89	78	67	56	46	36	26	16	6	0	0																									30
35	91	81	72	63	54	45	36	27	19	10	2	0																								35
40	92	83	75	68	60	52	45	37	29	22	15	7	0	0																						40
45	93	86	78	71	64	57	51	44	38	31	25	18	12	6	0	0																				45
50	93	87	80	74	67	61	55	49	43	38	32	27	21	16	10	5	0	0																		50
55	94	88	82	76	70	65	59	54	49	43	38	33	28	23	19	14	9	5	0	0																55
60	94	89	83	78	73	68	63	58	53	48	43	39	34	35	26	21	17	13	9	5	0															60
65	95	90	85	80	75	70	66	61	56	52	48	44	39	35	31	27	24	20	16	12	5	0														65
70	95	90	86	81	77	72	68	64	59	55	51	48	44	40	36	33	29	25	22	19	12	6	0	0												70
75	96	91	86	82	78	74	70	66	62	58	54	51	47	44	40	37	34	30	27	24	18	12	7	1	0											75
80	96	91	87	83	79	75	72	68	64	61	57	54	50	47	44	41	38	35	32	29	23	18	12	7	3	0										80
85	96	92	88	84	80	76	73	70	66	63	59	56	53	50	47	44	41	38	35	32	27	22	17	13	8	4	0	0								85
90	96	92	89	85	81	78	74	71	68	65	61	58	55	52	49	47	44	41	39	36	31	26	22	17	13	9	5	1	0							90
95	96	93	89	85	82	79	75	72	69	66	63	60	57	54	52	49	46	43	42	38	34	30	25	21	17	13	9	6	2	0						95
100	96	93	89	86	83	80	77	73	70	68	65	62	59	56	54	51	49	46	44	41	37	33	28	24	21	17	13	10	7	4						100
102	96	93	89	86	83	80	77	74	71	69	65	62	59	57	54	52	49	47	45	43	38	34	30	26												102
104	96	93	90	86	83	80	77	74	71	69	65	63	60	58	55	52	50	48	46	43	39	35	31	27	23											104
106	96	93	90	87	83	80	77	74	72	69	66	63	60	58	56	53	51	48	46	44	40	36	32	28	24	21										106
108	96	93	90	87	84	81	78	75	72	70	66	64	61	59	56	54	51	49	47	45	41	37	33	29	26	22	19									108
110	96	93	90	87	84	81	78	75	72	70	67	64	62	60	57	55	52	50	48	46	41	37	34	30	27	23	20	17								110
112	96	93	90	87	84	81	78	75	73	70	67	65	62	60	57	55	53	51	49	47	42	38	35	31	28	24	21	18	15							112
114	97	93	90	87	84	81	78	75	73	71	68	65	63	61	58	56	53	51	49	47	43	39	35	32	28	25	22	19	16	13						114
116	97	93	90	88	84	82	79	76	74	71	68	66	63	61	59	56	54	52	50	48	44	40	36	33	29	26	24	20	17	14						116
118	97	93	91	88	85	82	79	76	74	71	68	66	64	62	59	57	54	53	51	49	44	41	37	34	30	27	24	21	19	15						118
120	97	94	91	88	85	82	79	77	74	72	69	66	64	62	60	57	55	53	51	49	45	41	38	34	31	28	25	22	19	16	10					120
122	97	94	91	88	85	82	79	77	75	72	69	67	65	63	60	58	56	54	52	50	46	42	38	35	32	29	26	23	20	17	12					122
124	97	94	91	88	85	83	80	77	75	72	70	67	65	63	61	58	56	54	52	51	46	43	39	36	33	29	27	24	21	18	13					124
126	97	94	91	88	86	83	80	78	75	73	70	68	65	64	64	59	57	55	53	51	47	43	40	37	33	30	28	25	22	19	14					126
128	97	94	91	89	86	83	80	78	76	73	71	68	66	64	61	59	57	55	53	52	47	44	40	37	34	31	28	25	23	20	15					128
130	97	94	91	89	86	83	80	78	76	73	71	68	66	64	62	60	58	56	54	52	48	44	41	38	35	32	29	26	24	21	15	10				130
132	97	94	92	89	86	83	81	78	76	74	71	69	67	65	62	60	58	56	54	53	49	45	42	39	35	32	30	27	24	22	16	11				132
134	97	94	92	89	86	84	81	79	76	74	71	69	67	65	63	61	59	57	55	53	49	46	42	39	36	33	31	28	25	23	17	12				134
136	97	94	92	89	86	84	81	79	77	74	72	69	67	65	63	61	59	57	55	53	50	46	43	40	37	34	31	28	26	24	18	13				136
138	97	94	92	89	86	84	81	79	77	74	72	70	68	66	63	62	60	58	56	54	50	47	43	40	37	35	32	29	27	24	19	14				138
140	97	94	92	89	87	84	81	79	77	75	72	70	68	66	64	62	60	58	56	54	51	47	44	41	38	35	33	30	27	25	19	14	10			140
142	97	94	92	89	87	84	82	80	77	75	73	70	68	66	64	62	60	58	57	55	51	48	44	42	39	36	33	30	28	26	20	15	11			142
144	97	95	92	89	87	84	82	80	78	75	73	71	69	67	65	63	61	59	57	55	52	48	45	42	39	36	34	31	29	26	21	16	11			144
146	97	95	92	90	87	85	82	80	78	75	73	71	69	67	65	63	61	59	57	56	52	49	45	43	40	37	35	32	29	27	21	17	12			146
148	97	95	92	90	87	85	82	80	78	76	73	71	69	67	65	63	61	60	58	56	53	49	46	43	40	38	35	32	30	28	22	17	13			148
150	98	95	92	90	87	85	82	80	78	76	74	72	70	68	66	64	62	60	58	57	53	49	46	43	41	38	36	33	30	28	23	18	13			150
152	98	95	93	90	88	85	83	81	79	76	74	72	70	68	66	64	62	60	59	57	53	50	47	44	41	39	36	33	31	28	23	19	14	10		152
154	98	95	93	90	88	85	83	81	79	77	74	72	70	68	66	65	63	61	59	57	54	50	47	44	42	39	37	34	32	29	24	19	15	11		154
156	98	95	93	90	88	85	83	81	79	77	74	72	71	69	67	65	63	61	59	58	54	51	48	45	42	40	37	34	32	30	24	20	15	11		156
158	98	95	93	90	88	86	83	81	79	77	75	73	71	69	67	65	63	61	60	58	55	51	48	45	43	40	38	35	33	30	25	20	16	12		158
160	98	95	93	90	88	86	83	81	79	77	75	73	71	69	67	65	64	62	60	58	55	52	49	46	43	41	38	35	33	31	25	21	17	13		160
162	98	95	93	90	88	86	84	82	80	77	75	73	71	69	68	66	64	62	60	59	55	52	49	46	44	41	39	36	34	31	26	22	17	13		162
164	98	95	93	91	88	86	84	82	80	78	75	73	72	70	68	66	64	62	61	59	56	52	49	47	44	41	39	36	34	32	26	22	18	14		164
166	98	95	93	91	88	86	84	82	80	78	76	74	72	70	68	66	65	63	61	59	56	53	50	47	44	42	39	37	35	32	27	23	18	14		166
168	98	95	93	91	88	86	84	82	80	78	76	74	72	70	68	67	65	63	61	60	56	53	50	47	45	42	40	37	35	33	28	23	19	15		168
170	98	95	93	91	89	86	84	82	80	78	76	74	72	70	69	67	65	63	62	60	57	53	51	48	45	43	40	38	35	33	28	24	19	15		170
172	98	95	93	91	89	86	84	82	81	78	76	74	73	71	69	67	66	64	62	60	57	54	51	48	46	43	41	38	36	34	28	24	20	16		172
174	98	95	93	91	89	87	84	83	81	78	76	75	73	71	69	67	66	64	62	61	57	54	51	49	46	43	41	39	36	34	29	24	20	16		174
176	98	96	94	91	89	87	85	83	81	79	77	75	73	71	70	68	66	64	63	61	58	55	52	49	46	44	42	39	37	35	29	25	21	17	10	176
178	98	96	94	91	89	87	85	83	81	79	77	75	73	72	70	68	66	64	63	61	58	55	52	49	47	44	42	39	37	35	30	25	21	17	11	178
180	98	96	94	91	89	87	85	83	81	79	77	75	73	72	70	68	67	65	63	62	58	55	52	50	47	45	42	40	38	35	30	26	22	18	11	180
182	98	96	94	91	89	87	85	83	81	79	77	75	74	72	70	68	67	65	63	62	59	56	53	50	48	45	43	40	38	36	31	26	22	18	12	182
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188	98	96	94	92	90	87	85	84	82	80	78	76	74	73	71	69	68	66	64	63	59	57	54	51	49	46	44	41	39	37	32	27	23	20	13	188
190	98	96	94	92	90	88	85	84	82	80	78	76	75	73	71	69	68	66	65	63	60	57	54	51	49	46	44	42	39	37	32	28	24	20	14	190
200	98	96	94	92	90	88	86	84	82	80	79	77	75	74	72	70	69	67	66	64	61	58	55	53	51	48	46	43	41	39	34	30	26	22	16	200
205	98	96	94	92	90	88	86	84	83	81	79	77	76	74	72	71	69	68	66	65	62	59	56	54	51	49	46	44	42	40	35	31	27	23	17	205
210	98	96	94	93	90	88	87	85	83	81	80	78	76	75	73	71	70	68	67	65	62	60	57	54	52	49	47	45	43	41	36	32	28	24	18	210

(2b) From Table 1, the weight of water required to saturate 1 cu.ft. at 70° F. is .001151 lbs. However, the gas already has 10% of this. Ninety per cent of this therefore must be added or

$90\% \times .01151 = .001035$ lbs. of moisture.

For 1,000 cu.ft. 1.035 lbs. of moisture would be required.

(c) Now from Table 1, the total heat of saturated steam at 10-lbs. gauge pressure or 24.7 lbs. absolute = 1,160 B.t.u. per lb. At 70° F. the total heat of steam or vapor from the same table is 1,091 B.t.u. per lb. Therefore the heat available for heating the gas is .1160 — 1,091 = 69 B.t.u. per lb. of steam. But 1.035 lbs. of steam are required to bring 1,000 cu.ft. from 10% to 100% saturation. B.t.u. available then are $1.035 \times 69 = 71.4$ B.t.u.

(d) The temperature rise is equal to the heat available for heating (see c) divided by the B.t.u. required to heat the gas 1° F. (see 1e) or $\frac{71.4}{29.5} = 2.4°$ F. rise in temperature.

(e) If initial saturation of the gas had been 55% instead of 10% the heating effect would have been that produced by addition of 45% of moisture instead of 90% moisture or heating effect is one-half of (d) or 1.2° F.

Question 3. If the gas had been oversaturated what would be the effect of the extra steam upon the temperature of the gas? Assume, for example, that 15% extra moisture is added in excess of that required for saturation.

Solution 3. From (2b) the steam required for saturation is 1.035 lbs.

(a) 15% of 1.035 lbs. = .155 lbs. per M cu.ft.

(b) The steam going into saturating the gas remains in the vapor state. However, any extra steam condenses making available for heating the heat of condensation.

From Table (1)
Total heat 10-lbs. gauge = 1,160 B.t.u.
Heat of liquid 70° F. = 38 B.t.u.

1,122 B.t.u. per lb.

However, .155 lbs. are available or heat available = $.155 \times 1,122 = 174$ B.t.u.
However, 29.5 B.t.u. are required to heat 1,000 cu.ft. gas 1° F. 174 B.t.u. then will raise temperature an additional $\frac{174}{29.5} =$ 5.9° F., neglecting the slight change in the point of saturation occasioned by the rise in temperature.

Question 4. How much heat is required to raise the temperature of 1,000 cu.ft. of dry gas 5-lbs. gauge, 14.7-lbs. barometer, 1° F. at 40° F.; analysis as in Question 1.

Solution 4. (a) Density air 29.92" Hg. and 32° F. = .0807 lbs. per cu.ft.

Then by Charles and Boyle's Law the density at 40° F. and 19.7 lbs. absolute

$$-.0807 \times \frac{19.7}{14.7} \times \frac{492}{500} = .106 \text{ lbs. per cu.ft.}$$

.2375 B.t.u. per lb. × .106 = .0252 B.t.u. per cu.ft.
B.t.u. per 1,000 cu.ft. = 25.20 for air

But gas of analysis given required $\frac{8.65}{7.00} \times 25.20 = 31.2$ B.t.u. per 1,000 cu.ft.

Question 5. Assuming again 10% saturation what rise in temperature will be produced by injection of steam from 10-lbs. pressure to produce saturation at 40° F.?

Solution 5a. See Table 1.

Saturated Vapor pressure 40° F. = .1217 lbs. per sq.in.

From Table 1 weight of water vapor required to saturate at 40° F. =

TABLE III
TABLE OF RELATIVE HUMIDITY OR PER CENT OF SATURATION
FOR AIR AT 760 MILLIMETERS MERCURY BAROMETER
Temperatures in Degrees Centigrade

Dry Bulb Deg. C.	Difference Between Readings of Wet and Dry Bulbs in Degrees Centigrade																												Dry Bulb Deg. C.
	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5	6	7	8	9	10	11	12	13	14	15	16	18	20	22	24	26	28	30	32	34	36	38	40	
2	92	83	75	67	59	52	43	36	27	20																							2
4	93	85	77	70	63	56	48	41	34	28	15																						4
6	94	87	80	73	66	60	54	47	41	35	23	11																					6
8	94	87	81	74	68	62	56	50	45	39	28	17																					8
10	94	88	82	76	71	65	60	54	49	44	34	23	14																				10
12	94	89	84	78	73	68	63	58	53	48	38	30	21	12	4																		12
14	95	90	84	79	74	69	65	60	55	51	41	33	24	16	10																		14
16	95	90	85	81	76	71	67	62	58	54	45	37	29	21	14	7																	16
18	95	90	86	82	78	73	69	65	61	57	49	42	35	27	20	13	6																18
20	96	91	87	82	78	74	70	66	62	58	51	44	36	30	23	17	11																20
22	96	92	87	83	79	75	72	68	64	60	53	46	40	34	27	21	16	11															22
24	96	92	88	85	81	77	74	70	66	63	56	49	43	37	31	26	21	14	10														24
26	96	92	89	85	81	77	74	71	67	64	57	51	45	39	34	28	23	18	13														26
28	96	92	89	85	82	78	75	72	68	65	59	53	47	42	37	31	26	21	17	13													28
30	96	93	89	86	82	79	76	73	70	67	61	55	50	44	39	35	30	24	20	16	12												30
32	96	93	90	86	83	80	77	74	71	68	62	56	51	46	41	36	32	27	23	19	15												32
34	97	93	90	87	84	81	77	74	71	69	63	58	53	48	43	38	34	30	26	22	18	10											34
36	97	93	90	87	84	81	78	75	72	70	64	59	54	50	45	41	36	32	28	24	21	13											36
38	97	94	90	87	84	81	79	76	73	70	65	60	56	51	46	42	38	34	30	26	23	16	10										38
40	97	94	91	88	85	82	79	76	74	71	66	61	57	52	48	44	40	36	32	29	25	19	13										40
42	97	94	91	88	85	82	80	77	74	72	67	62	58	53	49	45	41	38	34	31	27	21	15										42
44	97	94	91	88	86	83	80	77	75	73	68	63	59	54	50	47	43	39	36	32	29	23	17	12									44
46	97	94	91	89	86	83	81	78	76	73	68	64	60	55	52	48	44	41	37	34	31	25	19	14									46
48	97	94	92	89	86	84	81	78	76	74	69	65	61	56	53	49	45	42	39	35	33	27	21	16	12								48
50	97	94	92	89	87	84	82	79	77	75	70	65	62	57	54	50	47	43	40	37	34	28	23	18	14								50
52	97	94	92	89	87	84	82	79	77	75	70	66	62	58	55	51	48	44	41	38	35	30	25	20	16	11							52
54	97	95	92	90	87	85	82	80	78	76	71	67	63	59	56	52	49	45	42	39	36	31	26	21	17	13							54
56	97	95	92	90	87	85	83	80	78	76	72	68	64	60	57	53	50	46	43	40	38	32	27	23	19	15	11						56
58	97	95	93	90	88	85	83	80	79	77	72	68	64	61	57	54	51	47	44	42	39	33	29	24	20	16	12						58
60	98	95	93	90	88	86	83	81	79	77	73	69	65	62	58	55	52	48	45	43	40	35	30	26	21	18	14	11					60
62	98	95	93	91	88	86	84	81	79	78	73	69	66	62	59	56	53	49	46	43	41	36	31	27	23	19	15	12					62
64	98	95	93	91	88	86	84	82	80	78	74	70	66	63	59	56	53	50	47	44	42	37	32	28	24	20	17	13					64
66	98	95	93	91	89	86	84	82	80	78	74	70	67	64	60	57	54	51	48	45	43	38	33	29	25	21	18	15	12				66
68	98	95	93	91	89	87	85	82	81	79	75	71	67	64	61	58	55	52	49	46	44	39	34	30	26	22	19	16	13				68
70	98	96	93	91	89	87	85	83	81	79	75	71	68	65	61	58	55	52	50	47	44	40	35	31	27	23	20	17	14	11			70
72	98	96	94	92	89	87	85	83	81	80	76	72	69	65	62	59	56	53	50	48	45	40	36	32	28	24	21	18	15	12			72
74	98	96	94	92	90	87	85	83	82	80	76	72	69	66	63	60	57	54	51	48	46	41	37	33	29	25	22	19	16	13	11		74
76	98	96	94	92	90	88	86	84	82	80	76	73	70	66	63	60	57	54	52	49	47	42	38	34	30	26	23	20	17	14	12		76
78	98	96	94	92	90	88	86	84	82	81	77	73	70	67	64	61	58	55	52	50	47	43	38	34	30	27	24	21	18	15	13	10	78
80	98	96	94	92	90	88	86	84	83	81	77	74	71	67	64	61	58	56	53	50	48	43	39	35	31	28	24	22	19	16	14	11	80
82	98	96	94	92	90	88	86	84	83	81	77	74	71	68	65	62	59	56	54	51	49	44	40	36	32	29	25	22	20	17	15	12	10	82
84	98	96	94	92	90	88	86	85	83	81	78	74	71	68	65	62	59	57	54	52	49	45	40	37	33	29	26	23	20	18	16	13	11	84
86	98	96	94	92	91	89	87	85	83	82	78	75	72	69	66	63	60	57	55	52	50	45	41	37	34	30	27	24	21	19	16	14	12	86
88	98	96	95	93	91	89	87	85	83	82	78	75	72	69	66	63	60	58	55	53	51	46	42	38	34	31	28	25	22	19	17	15	13	88
90	98	97	95	93	91	89	87	85	84	82	79	76	73	69	67	64	61	58	56	53	51	47	42	39	35	32	28	26	23	20	18	16	14	90
92	98	97	95	93	91	89	87	86	84	82	79	76	73	70	67	64	61	59	56	54	52	47	43	39	36	32	29	26	24	21	19	16	14	92
94	99	97	95	93	91	89	88	86	84	83	79	76	73	70	67	65	62	59	57	54	52	48	44	40	36	33	30	27	24	22	19	17	15	94
96	99	97	95	93	91	90	88	86	84	83	80	76	74	70	68	65	62	60	57	55	53	48	44	41	37	34	31	28	25	22	20	18	16	96
98	99	97	95	93	92	90	88	86	85	83	80	77	74	71	68	65	63	60	58	55	53	49	45	41	38	34	31	28	26	23	21	19	16	98
100	99	97	95	93	92	90	88	86	85	83	80	77	74	71	68	66	63	60	58	56	54	49	45	42	38	35	32	29	26	24	22	19	17	100

.000409 lbs. per cu.ft. But only 90% need be added. Hence actual requirements are $90 \times .000409 = .0003681$ lbs. per cu.ft.

For 1,000 cu.ft., this equals .3681 lbs. steam

(b)

Total heat at 10-lb. gauge = 1,160 B.t.u. per lb.
Total heat at 40° F. = 1,077 B.t.u.

83 B.t.u. per lb.

But only .3681 lbs. required or
$.3681 \times 83 = 30.6$ B.t.u. added

Rise in Temperature — $\frac{30.6}{31.2} = .98°$ F.

Question 6. What will be effect of adding 15% too much moisture?

Solution 6. Additional lbs. = $15\% \times .3681 = .055$ lbs.

Total heat at 10-lb. gauge = 1,160 B.t.u.
Total heat liquid 40° F. = 8 B.t.u.

1,152 B.t.u. per lb.

$.055 \times 1,152 = 63.4$ B.t.u.

$\frac{63.4}{31.2}$ B.t.u. = 2.03° F. rise in temperature.

Question 7. What cooling effect will be produced by injection of water spray in the gas specified in Question 1, assuming sufficient moisture is added to produce saturation at 70° F.?

Solution 7. In Question 1 it was shown that steam injection produced a heating effect. The effect of this slight heating is to drop the relative humidity at the increased temperature to slightly under 100%. However, as soon as the gas returns to the mains this slight rise in temperature is lost and humidity again is 100%. Injection of water spray, however, produces a cooling which requires a reduction in the addition of moisture if precipitation is to be avoided. For example, it is seen from Question 1 that for the conditions specified 1.035 lbs. of water are needed to saturate 1,000 cu.ft. of air at 70° F. from 10% R. H.

(a) Heat vaporization water 70° F. = 1052.7 B.t.u.

If all is available for cooling
$1.035 \times 1052.7 = 1,090$ B.t.u.

$\frac{1,090 \text{ B.t.u.}}{29.50} = 37.0°$ F. drop in temperature

(From 1-e)

Obviously some of the moisture added has been condensed. The method of approximation is necessary.
70° F. — 37.0° F. = 33.0° F. at which vapor pressure = .0912 lbs. per sq.in.

The vapor pressure originally required for saturation at 70° F. was .3628. Judgment would indicate that somewhere between .0912 and .3628 was the vapor pressure which combined with the cooling effect of the water would give the proper saturation that would avoid condensation at the point of water injection. For trial purposes a vapor pressure of .1780 at 50° F. is taken as a reasonable approximation. This would require an increase in vapor pressure from .036 to .1780 or .142 lbs. per sq.in. increase. However, at this point the density of saturated water vapor would be .000587 lbs. per cu.ft. For purposes of approximation the volume will be kept at 1,000 cu.ft. Now the weight of water to be added would be

$\frac{.142}{.178} \times .000587 \times 1,000 = .468$ lbs. of water

The total heat of vapor at 50° F. = 1,082 B.t.u.
The heat of the liquid at 70° F. = 38

Available heat energy per lb. = 1,044 B.t.u.

(c) $.468 \times 1,044 — 489$ B.t.u.

$\frac{489 \text{ B.t.u.}}{29.5 \text{ B.t.u.}} = 16.6°$ F.

(d) This first approximation indicates that 50° F. was within striking distance of actual conditions, since 70° — 16.6 = 53.4° F. This indicates that when the gas returns to 70° F. it will be unsaturated since addition of moisture at 50° F. sufficient to produce saturation at 70° F. would lead to condensation.

(e) Now if additional water is added to gas more than is required for saturation at 50° F. the temperature of the gas will rise due to heating effect of 70° water. For instance 15% extra water would give heating effect of

$.15 \times .468$ lbs. = .0687 lbs.
But each pound = 16.6 B.t.u. from 70° F. to 53.4° F. or B.t.u. available would be $.0687 \times 16.6 = 1.14$ B.t.u.

Heating effect would be $\frac{1.14}{29.5} — .039°$ F.

For all practical purposes the amount of cooling is proportional to the quantity of moisture to be added quite independent of temperature. The cooling effect therefore will be of the same characteristics as the vapor pressure curve if the gas is initially completely dry. However, such is not the case and the cooling effect might be anything.

Question 8. What per cent saturation should be maintained in a gas at 70° F. to secure saturation when the gas cools to 50° F.?

Solution 8. This can best be solved by the use of Fig. 3. Note the 70° at top of curves. Follow $T_1 = 70°$ curve until it intercepts the 50° T_2. Then note where their intersection lies relative to the graduation at the left showing relative humidity. The reading is 49% which is R. H. to be maintained at 70° F. to secure saturation at 50° F.

Conclusions

Water Spray. Much has been said about the lack of success in the use of water spray for gas saturation. From the analysis under Question 6, it is evident that this lack of success was undoubtedly due to the fact that the cooling effect produced by vaporization of water so reduced the temperature that saturation at the desired temperature was unattainable.

Methods of Humidity Measurement

Two Dry Bulb Methods. For the sake of comparison only the question of relative effects of addition of moisture and actual determination of the degree of saturation will be discussed here.

First, let us assume that the heating effect of the steam is measured by means of two dry bulbs. In problem 2, it was shown that 2.4° F. rise in temperature occurred in increasing saturation from 10% to 100% at 70° F. In problem 5, it was shown that at 40° F. this temperature rise of roughly one occurred for similar change in saturation. In other words, at 70° F. each 10% change in humidity gives temperature increase of about .3° F., at 40° F. this factor is 1° F. However, any supersaturation gives a rapid increase in temperature. For instance 15% excess addition at 70° F. gives a temperature increase of a rise in temperature of 5.9° F. whereas at 40° a similar excess gives 2.03° F. However, the tendency of steam injection is to raise the gas temperature so that any additional tendency toward supersaturation only accentuates risk of condensation.

In short any method dependent on

any rise in gas temperature is (a) inherently insensitive until supersaturation occurs. (b) Is variable dependent on the initial saturation. Due to this inherent insensitivity, any slight errors in temperature measurement immediately give serious errors in saturation.

In the wet bulb method the readings are independent of initial saturation if the system is correctly installed. By correct installation we mean (a) the wet bulb must have sufficient velocity over it to give correct wet bulb depression. (b) Both wet and dry bulbs must be in close proximity so as to avoid intermediate heating or cooling effects. (c) Both wet and dry bulbs must be exposed in the same gas at the same pressure.

(d) The wet bulb must be so installed that any moisture added by the wet bulb is measured. (e) That temperature systems are so installed that correct gas temperatures are measured sufficiently close to give readings which when interpreted into saturation will give satisfactory results.

Most of the factors enumerated are not unknown to any user of psychrometers but the factor (e) is worthy of more careful mention. Any temperature measurement is subject to errors due to radiation, convection and conduction. These errors are particularly evident in gas measurement where the fluid has a low heat value, where the pipe walls frequently are at widely different temperatures from the convection temperature of the gas and where radiation from the sun frequently arises. Care must be taken to insure that bulbs and sockets are designed to reduce these errors to reasonable values. Errors of magnitude of 5° are quite common on these measurements.

Now at 70° F., the wet bulb depression of 1° F. gives a relative humidity of 95%; at 40° F. a similar depression gives a relative humidity of 92%. On the average 1° F. differential gives a sensitivity of roughly 8% relative humidity.

A. Comparison of the two methods gives roughly

	Wet and Dry Bulb	*Heating Effect*
Sensitivity in per cent Humidity for 1° F. change	8% (average of 40° F. and 70° F. conditions)	50%
Effect of Variations in Initial Humidity	None	Serious
Ability to determine correct humidity to secure saturation at a lower temperature	May be Set Readily	Difficult to do; practically impossible

TABLE IV

Glaisher's Factors or A in the Equation $t_d = t - A(t - t_w)$

Where t = Temperature of the dew point in either Cent. or Fahr. Degrees
t = Dry Bulb Temperature
t_w = Wet Bulb Temperature
A = Glaisher's Factor

The following are the Glaisher's Values for various Temperatures

°C	°F	°A
— 8	17.6	8.55
— 7	19.4	8.27
— 6	21.2	7.83
— 5	23.0	7.28
— 4	24.8	6.61
3	26.6	5.80
2	28.4	4.92
1	30.2	4.06
0	32.0	3.32
1	33.8	2.81
2	35.6	2.54
3	37.4	3.39
4	39.2	2.31
5	41.0	2.26
6	42.8	2.21
7	44.6	2.17
8	46.4	2.13
9	48.2	2.10
10	50.0	2.06
11	51.8	2.02
12	53.6	1.99
13	55.4	1.95
14	57.2	1.92
15	59.0	1.89
16	61.8	1.87
17	63.6	1.85
18	65.4	1.83
19	67.2	1.81
20	68.0	1.79
21	69.8	1.77
22	71.6	1.75
23	73.4	1.74
24	75.2	1.72
25	77.0	1.70
26	78.8	1.69
27	80.6	1.68
28	82.4	1.67
29	84.2	1.66
30	86.0	1.65
31	87.8	1.64
32	89.6	1.63
33	91.4	1.62
34	93.2	1.61
35	95.0	1.60
36	96.8	1.59
37	98.6	1.58
38	100.4	1.57
39	102.2	1.56
40	104.0	1.55

TABLE V

Values of the Molar Heat constant C for various gases derived from values for C_p given in International Critical Tables

	Air	7.0
Hydrogen	H_2	6.9
Nitrogen	N_2	7.0
Carbon monoxide	CO	7.0
Carbon dioxide	CO_2	8.9
Oxygen	O_2	7.0
Methane	CH_4	8.6
Acetylene	C_2H_2	10.1
Ethylene	C_2H_4	10.2
Ethane	C_2H_6	11.8

The values given are the products of specific heat at constant pressure in calories per gram per ° C. multiplied by the molecular weight of the gas in question.

TABLE VI

A.

P_1 Initial Pressure in Lbs. Per Sq.In. Absolute	*Relative Humidity After Expanding from P_1 to the Same Temperature at 19.7 Lbs. Per Sq.In. Absolute*
19.7	100 %
39.4	50 %
78.8	25 %
157.6	12½%
315.2	6¼%
630.4	3⅛%

B.

Initial Pressure in Lbs. Per Sq.In. Absolute	*Relative Humidity After Expanding from P_1 to the Same Temperature at 15 Lbs. Per Sq.In. Absolute*
15	100 %
30	50 %
60	25 %
120	12½%
240	6¼%
480	3⅛%

In conclusion, analysis of the subject would indicate

(a) Use of steam to inject moisture.

(b) Use of some positive means for measuring humidity.

Recent Rate Regulatory And Tax Legislation Affecting Natural Gas*

By H. O. Caster

Henry L. Doherty & Co.

H. O. Caster

THE very rapid expansion of the natural gas business during the past few years has caused great activity in legislative bodies. They have attempted either to regulate the rates at which gas should be sold to the ultimate consumer, or to raise taxes from this industry. Much indirect legislation has been enacted by the legislatures of several states, as in the case of the California law, where the legislature sought to prorate the production of crude petroleum by regulating the production of gas from oil fields. This regulation was enacted under the guise of conservation and prohibited the production of gas unless a market therefor could be had. The law has been held constitutional by the courts.

In Kansas, the legislature of 1931 placed the control of the production of oil and gas in the hands of the State Public Service Commission. A reading of the statute convinces one that the legislature was seeking to regulate the production of gas only in so far as it affected the production of oil.

In Texas, the legislature passed a gas conservation law, which provided not only for the conservation of gas, but for its ratable taking from all producers in the same field. This law is now being tested in the courts.

Agitation to Prohibit Utility Merchandising

There was great activity in many of the states in urging the passage of laws which would prohibit so-called "utility merchandising." Bills were introduced in the legislatures of Texas, California, Illinois, Kansas, Indiana, Pennsylvania, Nevada, Missouri and Nebraska. A bill was introduced in the Massachusetts legislature proposing regulation and license by the Secretary of the Commonwealth, while a bill in Iowa aimed to give municipal utilities the right to merchandise. In so far as I am able to ascertain, only two such bills were passed, one by the Kansas legislature and one by that of Oklahoma.

The Kansas act provides that, after June 1, 1931, "it shall be unlawful for firms or corporations engaged in the manufacturing, transporting, distributing or selling of heat, gas, water, electricity or electric current to engage in the manufacture, wholesale or retail by sale or lease of any chattel, article, commodity, or manufactured product, except those articles which have been owned by such utility company in manufacturing, distributing or selling its utility service, or those articles which are the direct product of the business of manufacturing or distributing said utility service."

In Oklahoma, the law provides that "it shall be unlawful for any public service corporation in the state, directly or indirectly, to engage in the sale of merchandise, utensils or chattels of any sort not directly connected with the general business of such public service corporation as authorized by its charter."

The agitation for such legislation is widespread and active. Undoubtedly bills of similar nature to those passed in Kansas and Oklahoma will be introduced in the legislatures of a great number of other states at their coming sessions. It is our information, however, that the law in Kansas is a very unpopular one and that it will likely be repealed during the next legislative session.

Indirect Legislation

Indirect regulation was occasioned by changes in the public service and public service commission laws of a number of states. Originally, the Kansas Public Utility Law provided that an action might be brought in the Shawnee County District Court to set aside any order or regulation of the Public Utilities Commission because the same was illegal, unjust, unreasonable or confiscatory. The act was injunctive in nature and was a trial de novo. The court proceeded to try the case anew, on new evidence, and the evidence introduced at the hearing before the Commission was not admissible except upon the agreement of parties. The courts took the position that if the rate or regulation was reasonable when made, but had become unreasonable and was unreasonable at the time of the trial in court, the court would set it aside, and vice versa.

This act was recently amended by providing that an appeal should be taken to the district court in the county where the utility sought to be regulated was operating, and that the case should go to the district court on the record made before the Commission. This is much more burdensome to the utility. First, the evidence taken before the Commission is introduced into court. There are no rules governing the admissibility of such evidence by the Commission, so that a very great deal of evidence thus introduced would not be admissible in a court trial. Second, the appeal is taken to a court in the immediate vicinity of the utility's operation, which is much more subject

* Paper read before the Natural Gas Department Convention of the American Gas Association, at Tulsa, Oklahoma, on May 10, 1932.

to be influenced by public opinion or bias and prejudice by the court.

Attempts to Make Valuation for Rate Making Same as for Taxation

In a number of states, attempts have been made to make the valuation for rate-making the same as the valuation for taxation. In a number of them it is but a rule of the Commission, but in some few, such as Missouri and West Virginia, the legislatures have enacted laws providing that the valuation of utility properties for taxation and for rate-making purposes should be the same. We think these laws are unconstitutional. A utility is entitled to pay its taxes on the same valuation basis as other businesses, and the courts have very specifically said what are elements of value to be considered for rate-making purposes. However, the courts have held that where states' constitutions do not prevent it, legislatures may effect a different classification of properties for taxation purposes.

In some places, there is a growing tendency to collect franchise taxes. There has been considerable agitation for special taxation of utilities for school purposes; for an increase in income taxes to be paid by utilities, and for direct taxes on gas and electric output or sales.

"Severance" Laws Enacted in Several States

During recent years, a number of states have enacted so-called "severance" tax laws. Under such a law, a tax per M cubic feet is imposed for the right to produce gas. The severance tax is entirely different from a gross production tax, such as in force in Oklahoma. The gross production tax is based on the value of the mineral produced in the state, and is in lieu of all other forms of state taxation. It is somewhat comparable to the taxes paid by other industries in the state. The severance tax provides that, although one may own the land upon which he drills a well and produces gas, he shall pay for the right of producing it. Some states even go so far as to provide that where a man owns the land upon which timber grows, and, consequently, owns the timber, before he can cut it down he must pay the severance tax for that privilege.

This tax is not in lieu of other taxes, but is in addition thereto. I know of no more vicious form of taxation. A state that can enact a severance tax law covering the production of oil and gas can tax the farmer for the right to cut his wheat.

Taxes Constantly Increasing

In Texas, a two per cent gross production tax was recently enacted. In Iowa, a bill was introduced in the last legislature proposing to tax pipe lines 15 cents per M cubic feet on gas brought into and sold within the state. In Arkansas, special taxes were proposed on electric, gas, telephone and telegraph companies to retire school bond indebtedness. In Kansas, a bill was introduced which provided for a two per cent gross production tax on natural gas, and a proposal was made for a constitutional amendment to cover progressive income tax. Alabama passed an act taxing gas 2 cents per M, and in Georgia an act was passed taxing gas 10 cents per M cubic feet.

Bills have been introduced proposing a flat tax per meter; a flat tax per mile of pipe line; an excise tax on the percentage of gross business done within the state; a graduated sales tax on retailers; a special tax on utilities having equipment on public highways and in parks, etc., and requiring fees from distributors and owners of gas systems using and producing from outside the state. It has also been proposed to levy a direct tax of five per cent on monthly bills under the sales tax and a license tax on the sale of utility equipment.

Oregon now imposes a five per cent tax on the gross earnings of utilities operating within the state without franchises. This does not apply to utilities with franchises, and the act is a direct incentive for municipalities not to renew expiring franchises.

In some states, laws have been enacted attempting to place upon the utility the whole or a part of the cost of utility administration, such as in Kansas, New Hampshire and Pennsylvania. In others, the Commission is authorized to make valuations of the utility properties for the information of the Commission, and at the expense of the utility, as in Missouri.

In a number of states, a service charge is prohibited by law, and there is an increasing demand to abolish such charges. Bills looking to this end were introduced in recent legislatures of Maine, Nebraska and Ohio.

Legislation on Holding Companies

Bills affecting holding companies were introduced in recent legislative sessions in Kansas, Maine, Massachusetts, Missouri, New Jersey, New York, Pennsylvania and Wisconsin. The new Oregon Commission Act has far-reaching provisions in this respect and requires, among other things, the approval by the Public Utility Commission of contracts between utilities and affiliated companies. Some of the bills contained provisions restricting stock ownership and proposed to further regulate mergers, and in one or two such bills it was proposed to make holding companies utilities.

In a number of states, there are laws which prohibit any person, firm or corporation from owning, holding or voting more than a certain per cent, usually 10 per cent, of the stock of any utility doing business in the state. Management, engineering and similar contracts are made subject to the approval of Commissions.

Federal Legislation

The Supreme Court of the United States has uniformly held that natural gas pipe lines transporting gas interstate were engaged in interstate commerce, over which the states had no control. In fact, the Congress, in the act of regulating commerce, specifically excepted pipe lines transporting natural gas from the provisions of the act. During 1929 and 1930, there was considerable agitation for an Act of Congress placing gas pipe lines engaged in interstate commerce under the control of some federal regulatory body. Senator Capper of Kansas introduced the bill providing for such control; however, the bill did not pass during the short session of Congress. In the meantime, the National Association of Railway and Public Utility Commissioners, at its annual session in the fall of 1931, went on record as against such federal legislation, and no such

bill has been introduced in Congress during the present session. It is not likely that such a bill will again be introduced. Such legislation, we think, will be obviated if the pipe line companies engaged in interstate commerce show a willingness to supply regulatory bodies with information regarding their investment and earnings. We think that the regulatory bodies and the public are entitled to this information.

There has been some discussion during the present session of Congress of the propriety of placing an excise tax on the natural gas business, but at the present time there is no such provision in any proposed bill.

Agitation for Municipal Ownership of Utilities

During the last few years, there has been great agitation for municipal and government ownership of utilities. Proposals to facilitate such ownership have been made in at least 15 states, including Arkansas, Idaho, Illinois, Iowa, Kansas, Massachusetts, Minnesota, Missouri, New Mexico, Oklahoma, Washington and Wisconsin. We do not believe that municipal ownership will be as popular in the future as it has been in the past because of the widespread protest against increased taxes, and especially the increase of taxes by cities, counties and states. We believe that the taxpayer is beginning to realize that governments, whether they be city, state or national, cannot efficiently and economically manage business enterprises, and that this applies to utilities as well as to other industries.

Bills have been introduced in a number of states, notably in Colorado, Idaho, Kansas and Texas, with a view to regulating gas pipe lines in one form or another, including the classification of such pipe lines as common carriers. In North Dakota, a bill was introduced, but not passed requiring gas companies operating pipe lines to establish and maintain reserve gas tanks.

The activities of state and federal governments have increased to a very great extent. Boards and commissions of almost every description have been established which go all the way from regulating railroads and utilities to investigating businesses of every kind and character. There is ever the tendency of governments to reach out and grasp more and more authority.

Cost of Government Increasing

In government, it is too often not questioned how few men can do a job, but how many men can be put on it. The government takes on a clerk. No sooner does he become established than he wants a private office with a swivel chair, a mahogany desk, a brass cuspidor; then he wants a stenographer; then he wants helpers; each helper wants a private office, and so the process begins anew. In private business, these expenditures and useless expansions must be eliminated or the business fails, and only those survive who are able to keep their operating and administrative charges within reasonable bounds. But if the governmental business fails to make its operating expenses, it levies a tax to make up the deficit.

To raise the money to defray these ever-increasing costs, governments have resorted to every known method to get the largest amount of money possible with the least amount of fuss. It has been estimated that the total amount of wealth produced annually in the United States is about 70 billions of dollars, and that approximately 14 of these 70 billions are expended in the maintenance of government. And we who are engaged in the public utility business may expect that every possible attempt will be made to wring from us in taxes the last penny possible. We believe that utilities should bear their fair share of taxation, and that utility operators should take an interest, along with other taxpayers, in seeing that the unnecessary expenses of government are curtailed; that government is simplified and confined within its legitimate bounds of governing, and that private enterprises be allowed to carry on the businesses of the country.

Natural Gas Business Is a Service

We who are engaged in the gas business are selling a service. We invest millions of dollars in building pipelines to transport gas from the fields to the markets; we deliver gas through our distributing companies to the customers, a majority of whom pay bills not to exceed $2 or $3 per month. We must keep the accounts of each individual customer, must read his meter, and must see that he gets perfect service every month. If we could wholesale our product in large quantities, we would be enabled to dispose of it at a fraction of the price we must now get. A farmer can haul a 75-bushel truckload of wheat to town and dump it into the elevator at one price per bushel, but if he has to distribute it around town a bushel at a place for chicken feed, then go back at the end of the month and collect for it, he must get another price. In one instance he is selling wheat, and in the other instance he is selling service.

Furthermore, the natural gas business is confronted with great mining hazards. A company builds a big system costing millions of dollars; it takes its chances on a gas field being opened within a few miles of its markets (this has happened repeatedly in the past few years); it takes the chance of the gas field playing out, either because of poor estimation as to the reserve, or because the gas is allowed to be wasted. Several times as many cubic feet of gas are daily blown into the air as are consumed, and to date no adequate conservation laws have been passed and enforced.

The natural gas industry has a great many problems to meet, but that's the gas business, and he who is not willing to meet these problems cheerfully and intelligently will eventually get out. We have the assurance that we are engaged in a useful business, supplying not only a luxury but a necessity of life, and that if our project is well conceived, with an adequate gas supply and an adequate market, if we carry out our obligations to the public and meet our situations intelligently, we will succeed.

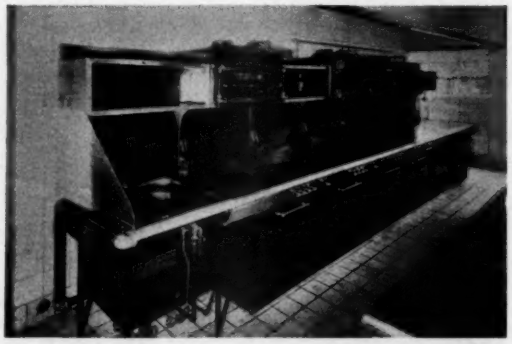
Dr. Vandeveer To Speak

DR. F. E. VANDEVEER, supervisor of the American Gas Association Testing Laboratory, Cleveland, Ohio, will address the twenty-fifth annual meeting of the American Home Economics Association in Atlanta, Georgia, June 22. His subject will be "Minimum Requirements for Gas Burning Household Appliances" in the group discussion on "The House and Its Equipment."

Modernized Gas Cooking Equipment, Dealer Aid In Meeting Fuel Competition

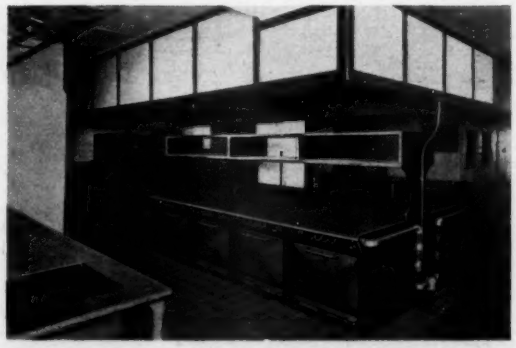
Main Kitchen, Cornell Medical Center, N. Y.

Sherman Hotel [illegible]



Typical Department Store Installation

Monel Ranges—Typ[illegible] A. T



Installation at King's County Hospital, Brooklyn, N. Y.

After Conversion from Oil [illegible]anges [illegible]n Diego, Ca

WE all agree that continuous national as well as local advertising and co-operation will popularize the use of almost any article over night. The public, fickle to the old, turn swiftly to the new as a modern solution to their every-day problems. Millions have been spent and are being spent yearly, not only through intensive research, but through pages and pages of magazine and daily newspaper advertising and publicity to advance the many uses of electricity and electric consuming appliances and equipment. As a result the public has become "electric minded" and our selling job in the hotel, restaurant, and institutional cooking field has become a real art of salesmanship, through self-convincing facts and figures of the many distinctive superiorities of gas fuel over electricity.

How are we going to meet this fuel competition which has been constantly growing everywhere? Only a few years ago, one seldom heard of the sale of a heavy duty electric cooking installation. Everything has been going gas throughout and our job has been merely one of furnishing whatever gas-burning appliances that would meet the needs of our customer.

Everything is in our favor if we will only take advantage of the many improvements and newly developed heavy duty appliances that have made their appearance in the last year. Economy and improved operations are foremost in the minds of every chef, hotel manager, hospital superintendent, dietitian, etc. Many are discarding the old for the new whether it be for gas or electric equipment as a solution to their cooking problems. Economizing in the heavy duty gas cooking field is to modernize with insulated ranges with oven heat control, insulated deep fat fryers, radiant surface broilers, and insulated bake ovens with heat control as illustrated herewith.

Modernizing of old kitchens through installation of new improved and up-to-date gas equipment throughout, and reducing fuel cost in keeping with present-day food sales will eliminate most of our fuel competition in this field. In most cases this means cutting down on range space or rearranging the equipment and being on the lookout not to install any more equipment than is needed to operate the job in an economical and efficient manner. Our proposals on these replacements are always more effective when accompanied by drawings and specifications and not merely a quotation on the equipment to be furnished and installed.

The installation of old-type, used or rebuilt heavy duty equipment will seldom improve conditions in any kitchen and is usually looked upon as a poor investment and little aid in meeting present-day fuel competition.

On new building jobs, a definite plan and specification of gas service and gas piping to all parts of the building must be furnished to the architect as soon as we are able to get working drawings of the proposed building. On such new jobs where

By E. V. Bowyer

Hotel Equipment Representative
Standard Gas Equipment Corp.

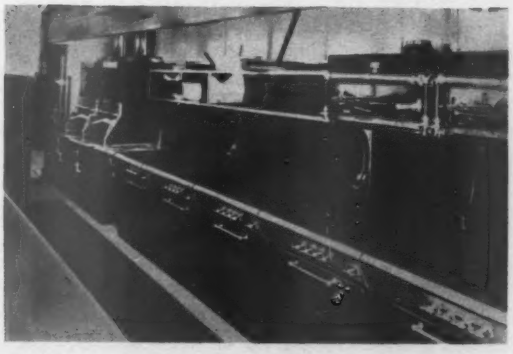
...an Hotel (...icago) Installation

Kitchen of Storm King School, Cornwall-on-Hudson, N. Y.

...nges—Typi... A. T. & T. Installation

Installation at the Biltmore, Oklahoma City, Okla.

...n from Oil ...nges at U. S. Naval Station, San Di...o, Calif.



Typical Layout of Savarin Restaurants

heavy duty cooking is to be done, the equipment layout and specifications are usually taken care of by the architect, through cooperation with the kitchen equipment manufacturers. This is where fuel competition begins, for seldom is the gas company called in to quote rates and submit operating costs, etc. In this connection, our work changes from one of merely quoting on gas cooking equipment to one of selling gas as a fuel.

Absolute dealer cooperation and protection in specifying gas as a fuel, selling and installing modern improved up-to-date gas burning equipment, is one of the most serious problems before us at this time in meeting fuel competition. The dealer or the kitchen equipment house usually employs trained salesmen, technical engineers, and draftsmen, to assist owners and architects in preparing plans and specifications for various prospective jobs. This expense runs into thousands of dollars yearly and the only compensation in return is derived from sales of equipment. The kitchen equipment dealer, therefore, claims the heavy duty gas cooking equipment as a part of his rightful business.

Many of the large oil and electric heavy duty cooking jobs have been specified and installed by dealers in an effort to prevent competition with utility companies on gas burning equipment.

In order to perfect a closer dealer tie-up, many of the large power systems and electric range manufacturers have gone so far this year as to take over the entire planning, engineering and specifications on jobs for the kitchen equipment manufacturer. It has been noted that a prospective customer will usually leave fuel problems entirely in the hands of the kitchen equipment dealer. He has been responsible to a great extent for popularizing the use of electric bake ovens, electric fryers, etc. If we will only look far enough, every job or item lost for gas fuel will tell its own story, and most of them if worked on with the dealer in the planning stages can be saved for gas by the mere twinkle of the eye.

Many of the large electric equipped jobs have been displaced for gas due to slowness of operation, outage of current, electrical disturbances, high fuel and maintenance costs. The initial cost of standard finish electric heavy duty equipment and its installation is several times greater than that of standard finish up-to-date and modern gas equipment. Cases have recently been brought to our attention where power companies offer rates as low as 1.06 cents per k.w.h. and on one prominent job an estimated electric fuel cost per month of $106.00 was quoted. After a hard battle, modern gas equipment was installed and is being operated today at a lower fuel cost than that for electric fuel.

We have added kitchen beauty today as never before, in the sparkling luster of stainless steel gas cooking items at less cost than the standard finish electric equipment. Many installations have been saved for gas fuel at the last minute, by the dealer offering this and other features such as modernized flush front, insulated, secret flue ranges, deep fat fryers, radiant surface broilers, and insulated bake ovens with heat controls.

Modernized equipment, advertising and absolute dealer cooperation, well coordinated with intensive sales promotion, is the best implement available today to educate the consumer to a preferential recognition of the merits of gas fuel for heavy duty cooking and baking.

A Few Thoughts on Load-Building For the Gas Industry*

Morse DellPlain

THE gas business has shown remarkable strength during the depression. It has fully demonstrated an inherent stability which ought to be sufficiently reassuring to all of those engaged in it. It is too easy, however, to generalize on its merits, and with the wish father to the thought, delude ourselves into a frame of mind where we feel our position is impregnable and our future successes inevitable. We survive and thrive only as we justify our existence economically in the social and commercial system which determines American life from day to day. Sentiment and precedent mean little. Economic law is impartial in its operation and ruthless in its punishments. Our national troubles today are due to a nationwide effort to go against economic law. Our industry will be in trouble if we get away from the fundamentals of our business and use expediencies as fixed policies. Fundamentals are never old-fashioned. It is only their application that may become temporarily out of date.

What few ideas I may venture today on the subject of load-building are intended to be expressed in terms of fundamentals; the specific application of them to our various local sales problems I shall leave to your own best judgments.

Let us first take the very topical question of gas or electric cookery. The gas business must meet the challenge of the electric competition in that field. This challenge is a blow at the very fundamentals of our business, whether we be so-called straight gas or combination companies.

* Address delivered at Metropolitan Regional Gas Sales Conference, Lake Mohonk, N. Y., May 26, 1932.

By Morse DellPlain

President,
Northern Indiana Public Service Company

A public utility, whether it be gas, electric, water, transportation or communication, is classed as such and justifies its existence because it supplies a service rather than a product. The revenue of that utility is commensurate with its success in inducing its customers to appreciate and use that service, and this revenue is dependent entirely on its load and the rates it charges for service. To borrow some terminology from our technical brothers and apply it to the analysis of our sales economics, it will be proper for me to say that the load, according to the characteristics of the service supplied, may be properly classified as either "base load" or "increment load."

Another Example

While hardly analogous, the following example from another field might illustrate the point. Let us consider the hypothetical case of a newspaper serving alone a certain territory. Its first job is to print the local news for its subscribers and sell its advertising space at rates commensurate with its circulation. It is with this in mind that the original investment in printing machinery and equipment is made, and the publisher knows that the soundness of his investment will be determined by his ability to derive an adequate revenue from the publication of the newspaper to cover his fixed costs and pay him a profit on his capital investment. The circulation he obtains and the advertising space he sells are the "base" load of that publisher's business, and the subscription and advertising rates he uses are established to cover the major portion of his fixed costs. However, because he already has the machinery and the facilities, the publisher is in an excellent position to do a job printing business too. In this field, he has to face the competition of other job printers in the territory, and the price for his job printing work must meet competition if he hopes to get any of the business. All the business that comes from job printing can be classed as "increment" load. The newspaper ("base" load) is the meat and potatoes of his business; the job printing ("increment" load) is the salad and dessert that supplement and enrich the revenue diet of his enterprise.

With this crude illustration in mind, let us examine the "base" and "increment" features of the public utility load. We have built our gas plants, laid our mains and started selling gas service on the theory that our investment would be profitable. It was predicated on the assumption that a certain class of business could be obtained due to the immediate advantages offered by some inherent characteristics of gas service that make it acceptable to the public on a non-competitive basis.

In the gas business, the base load is cooking. It is often called the backbone of the domestic load. Our rate structures, if correctly designed, provide for these basic features, by taking care of the major part of the fixed costs of serving our customers in the base steps. This is possible because of the non-competitive nature of the class of service rendered. In the electric business we readily classify as base load such uses as lighting, small domestic power applications such as washers and vacuum cleaners and miscellaneous small socket heating appliances, as irons. Cooking is not a base load in the electric business.

Favors Base Load Protection

Increment load can be defined as that load which is represented by ad-

ditional uses to which the service may be subjected and which, because of competition from other sources, has not yet received general customer acceptance. Increment load in the gas business is water-heating, refrigeration, home-heating, etc. Rates for the increment load are necessarily lower and designed primarily to meet a competitive situation and thus induce increased use of the service. On the basis of this premise we are led to the logical conclusion that it is economically, and therefore fundamentally unsound especially in the case of combination companies, to displace the base load of one service to gain increment load for the other. I think it should be a factor of the first importance in formulating policies regarding gas and electric cooking to be sure that the base load is being protected and not being robbed to secure increment load for some other form of utility service.

After a very careful study of this particular angle of our business, I am firmly convinced that very definite policies should be adopted by the management of combination properties looking toward the protection of the base load of each class of service and that the aggressiveness of the sales effort should always be directed toward building up the increment load. I can say this without fear of being classed as a closed-minded gas man. My background is an electrical one. I first entered the utility business as an electric power salesman after several years' service as a salesman-engineer for an electrical machinery manufacturer. No one can claim that I have a natural prejudice in favor of the gas business. I am sure that a study of the economics of a combination company's business will convince you that the interests of the public and of the stockholders will be better served by a policy such as I have outlined. A still more careful study will show that the general sound economics of the gas and electric utility business generally requires that this distinction between base and increment load be recognized even though the two utilities may be at the time under separate managements.

The form of rates to be used is necessarily closely tied in with the question of classes of load. During the last ten years or more there has been some very constructive work done by the American Gas Association and in the field, in evolving rate forms that more truly represent fair returns for services rendered. The electric men led the way originally, and it has been very gratifying to see similar rate forms adapted more and more to gas service. Whether they are service charge or initial use rates is of no particular importance, so long as they cover the requisites of a good promotional rate which are that the base load steps cover the major part of the fixed costs, and that the increment load steps be load-inducing, i.e., promotional in the face of competition or customer resistance.

Move Along Logical Lines

These rates have been won more often than not, only in the face of determined opposition. The unsound precedents created by straight line rates created a public and political obstacle hard to overcome. Those of you who have followed the history of gas rate changes in the domestic field will recall that a considerable number of our promotional form of rates were successfully introduced during the past ten years at such times as gas companies found it possible to grant reduction in the cost of domestic service. We now find ourselves not necessarily able to make further reductions but faced with a more or less unintelligent public demand that the cost of all service be reduced regardless of the economic merits of such a demand. I am not saying that such a demand be ignored or that reduction for psychological reasons be not made, but I do say that we should avoid doing anything under the present stress which will sacrifice the progress we have made in the past decade in the matter of form of rates. If we find ourselves economically able to make reductions let us by all means make them, but let us make them along logical lines and maintain the promotional features in our rates. In other words, let us not adopt unsound expedients for the sake of satisfying a misdirected public clamor. It would be most unfortunate if, purely for expediency purposes, we abandoned our progressive rate policies. Expedients, no matter how necessary, are always dangerous, and any expediencies in the rate field—that is, where fundamentals are disregarded—are apt to prove disastrous. The promotional form of rate has proved itself a splendid load-building medium and we, as load builders, should give it its just prominence in our load-building plans. The more increment load we can convert through general usage into base load, the sounder our position becomes and the cheaper the cost of our service will come to be for the average consumer.

Those conditions are gone forever, I believe, which precipitated the crisis we have recently experienced with our dealer trade organizations. Time is too short to review all the causes behind the rumpus. Summarized, however, it seems to me that our desire for volume of merchandise sales rather than load itself was the real cause of our troubles. Again, we seemed to have lost sight of the fundamentals. We merchandise, as I see it, for two reasons:

First: To pioneer new uses for our services, by selling appliances that do not have customer acceptance.

Second: To establish a quality standard on all gas merchandise.

Cooperation With Dealers

Surely, behind these two policies, there should be no reasonable cause for a quarrel with our logical trade allies who are the dealers in our territory selling standard gas appliances. I maintain that if we had stuck to first principles, there never would have been a quarrel. It is a striking testimony to our own industry's leadership and that of our dealer associations that we have been able to find ways and means to settle our differences amicably. The six principles of cooperative merchandising issued by the Trade Relations Committee of the American Gas Association, are in my judgment, fund-

amentally sound and applied locally they can be made a very constructive phase of our load-building activities. It is unnecessary for me, before this audience, to discuss this subject very much in detail, but I should like to point out one or two fundamentals in connection with these principles.

My experience with dealers has been one of compromises, as is to be expected. I can say, however, that in general I have found their viewpoint reasonable. As long as they sell A. G. A. approved merchandise, as they have agreed to do through their associations, why shouldn't we encourage them by making the gas appliance business profitable for them? Why should we feel disappointed in them because they refuse to be load-minded. To be load-minded is our business, not theirs. It is fundamental that they are in business to make gross profits which, when overhead is deducted, leave something in the cash register for their efforts. If we appreciate their potential load-building value to us, it certainly is up to us to conduct our own merchandising operations in such a manner that they can meet our prices and terms at a profit to themselves.

Dealers Seek Opportunity

I often hear the criticism that these fellows cannot merchandise, that their attitude is a "sour grapes" one, etc. That's beside the point. Through their national associations they have never insisted that they can do the merchandising job that we have done. Their position has been that they are entitled to an equal opportunity to merchandise gas appliances alongside us. If we, as a public utility, are willing to make merchandising concessions to secure load at the expense of our merchandising gross profits, then we ought to be willing to extend those same concessions to them, because after all, the load from their standard appliance is the same as from ours.

Two factors the dealers have most objected to are our term payment plans, and an apparent ruthlessness in our methods, which we in our turn considered aggressiveness. The term payments objection is wiped out by either restricting our terms to equal theirs or by discounting their paper. If our present terms are right fundamentally, then their is a load-building advantage in discounting dealer paper. The apparent ruthlessness in our sales methods is the factor I should like to dwell on. Is not our super-aggressiveness the effect of a cause, and is not the cause really our methods of compensating our sales departments? Again, let us examine the fundamentals. Our merchandise is a medium for securing load. The value of a utility merchandiser to his company is logically directly proportional to his ability to protect base loads and secure additional increment loads. With this viewpoint of utility merchandising in mind, the connection between utility and retail merchandising is more apparent than real. In other words, the volume of merchandise sold is not necessarily the true gauge of load-building accomplished. To reflect the true load-building idea in our merchandising operations, we should devise ways and means of arranging our sales compensatory policies so that we pay for added load rather than volume of merchandise sold. This would do two things. It would concentrate our sales mentality on load and additional revenue and it would remove a sore spot in our trade relations.

Cannot Cooperate on Firing Line

It is fundamental that we cannot cooperate and compete on the firing line, no matter how we feel about it and what our intent is in the front office. So long as our salesmen are paid for their own volume of retail sales only and encouraged to take sales away from cooperating dealers, there can be no real cooperation on the actual firing line where, in the final analysis, the success of any co-operating plan is determined. It must be frankly admitted that most of our salesmen's compensatory plans are out of tune with the times, and the sooner we begin the necessary revisions, the sooner will we have the decks cleared for a real load-building job.

My conception of the utility domestic appliance salesman of the future is a man working in a clearly defined zone, charged with the responsibility of adding a definite quota of additional revenue to the company's system in that zone. It will be of little importance whether these appliances are sold by the utility or dealers, so long as the requisite number of appliances are connected. He will be paid a salary adequate to allow him to spend some of his time protecting and consolidating present load, and his total earnings will be predicated on total additional revenue received, whether it be secured through dealers' or his company's sales. By paying him an overwriting bonus, commission, or whatever you choose to call it, based on the load value of the appliance, all elements of competition between utility and approved dealer will be removed. In the event a dealer with an approved appliance competes against him for the retail sale, he will be in a position to talk only about gas utilization, while at the same time endorsing the dealer's appliance. Besides being good public relations, it will be good business because the dealer will get the gross profit and we will get the load.

Still talking of fundamentals, is it not a fact that sales results depend largely on the sales effort exerted on the market? Is it not also fundamental that no one gas company can begin to merchandise all the quality equipment that is available? Under present conditions, those manufacturers whose products are retailed by the gas company have a tremendous advantage over the vast majority who are not in the utility picture. I think, therefore, it would be good business from a load-building viewpoint to remove this handicap and broaden our field to give other manufacturers the opportunity the quality of their goods warrants. We will benefit from the additional sales and educational effort expended by these manufacturers in developing a local market for their equipment. I know of a particular heating job where the architect specified an oil burner. Thanks to a broadened co-

operative plan, six manufacturers of gas heating equipment persuaded every heating contractor in that district to enter an optional bid on gas heating equipment. The architect just had to sit up and take notice and eventually change his specifications, with the result that gas is heating that building today. In a restricted field, the gas company, probably with one dealer, would have been bidding on gas equipment and four dealers would have been plugging for oil. What would the chances have been of that job going to gas, with the architect already committed to oil? The same logic applies to gas ranges, water heaters, refrigerators, and other load-building equipment. It perhaps will mean a sacrifice of merchandise volume but it unquestionably increases our load-building potentialities.

Operating Employe Can Sell

The operating employe can and should be induced to play an important part in our load-building activities. This is not theory for I have the proof. No doubt many of you also have such proof. The district that won our championship sales trophy last year did not have a salesman in it. We had a sales supervisor roving over an area of approximately 5,000 square miles and all the active selling done by our company was done by operating employes. It started as a case of "needs must when the devil drives," the "devil" in this instance being poor business conditions. Our plans to meet the situation called for educational effort among the employes in company policies generally, so that understanding how important sales were to the progress of the company, they were more readily-minded to take part in sales work. We paid them for their efforts, of course, and the results they obtained speak for themselves. I find *they have the tremendous sales advantage of not being salesmen.* It must be emphasized that they were led and not driven and they themselves deduced from our educational efforts that selling was a means of writing insurance on their own operating job, rather than receiving the same conclusion in the form of a kid-gloved threat from the Management. Another district larger still is trying the same plan this year, and according to last reports it is next to the top to date on additional revenue obtained. Any employe, these business-less days, must appreciate that additional revenue, is in fact, insurance on his job. Travel in a Pullman nowadays and notice how earnestly the porter tries to sell you a section to yourself, and you realize that the idea of getting new business through operating employes is one that others beside ourselves think has definite merit.

At a conference like this, there is not much occasion to talk about the merits of properly organized advertising, whether it be newspaper space, bill-board, direct-by-mail, window display, or broadcasting. There are some fundamentals, however, that merit consideration in connection with its character, rather than its use. I have never cared much for so-called "good-will" advertising. If we are doing our job right there is not much need to spend money in space or printing to tell our customers how good we are. In the gas business particularly, actions speak louder than words and we should be well satisfied to let our customers make their decision on our merits accordingly. Nor am I so impressed by an advertisement with an illustration of a self-action water heater with descriptive copy about the thickness of the insulation, the gauge of the steel inner tank, the dependability of the thermostat, and all capped with a line in bold face proclaiming that for a very limited period this paragon of all gas virtues can be purchased for only $5 down. If I were a master plumber, I might grant you the selling value of that advertisement. But, as a gas utility man, I much prefer to see that advertisement re-worded to describe the advantages that this self-action water heater brings to the home and the part gas service plays in making such beneficial equipment available. In other words, I am thoroughly sold on gas company advertising that sells the merits of gas service, that educates people how to use gas to greater advantage, and that builds up within our customers a greater appreciation of its value to them in a civic, commercial or social way; and I am a firm believer in the idea that the pages of your local newspaper are the ideal medium to put this story across to your public. It is futile to add that such advertising was never more valuable nor never more needed than at present; the seeds, if you please, from which will grow the future successes we believe our industry is destined to enjoy.

Servicing Policies Vary

On the theory that anything we do to win friends for our company and build up public appreciation of our service is fundamentally good load-building, I attach much importance to the subject of servicing the appliances and equipment connected to our lines. The nature of our business is such that it is not the gas itself, but the facilities with which it can be used and the efficiencies at which it is used, that determine its value to the customers. As load-builders, we are directly interested in enlarging the facilities for use through our appliance sales. As gas men, our responsibility has just begun when the appliance is installed. It continues during the entire life of the appliance. When this watch was bought, I was not buying a piece of machinery in a gold case. I was buying a means of measuring time. So long as it runs accurately, I have what I bought. The minute it ceases to function properly, its value to me is gone. The same reasoning is applicable to a gas applicable to a gas appliance with this one important difference. When the watch goes bad, I am charitably inclined to blame myself or the weather, because I know it is a good watch. If a gas appliance goes bad —the burner gets out of adjustment or the oven springs a leak—whom does the housewife, nine times out of ten, blame? The gas company, of course!

"It must be the poor gas," she reasons, because to blame herself

would be indicting her ability as a housewife, and to blame the appliance would be an admission of an error in her judgment in purchasing it. It is fundamental, therefore, if we would protect our present "base" loads and develop our "increment" loads, that we must be prepared to render first rate service on our connected appliances. Just what our servicing policy should be is beyond my sphere today. It depends entirely on local circumstances, such as the kind of territory to be covered, the habits and characteristics of the people, the precedents already established. It is, however, most essential that a clearly defined policy be established and a system of operation put into effect which ensures for gas service efficient utilization with a minimum of interruptions.

Because I have not mentioned our industrial and commercial load-building activities is no evidence that I ignore their value. The fact that my company has trained specialists cultivating these fields is sufficient proof that we value this load. Their development is more a technical one, calling for engineering with the right application of fuel economics, rather than our general conception of a selling job. So without wishing to minimize the importance of this very necessary part of our load, I have purposely chosen to confine my remarks to the domestic field.

The subject of load-building is a bigger one, of course, than can be adequately covered by all speakers, let alone one, at a conference like this. From my experience, however, I have tried to recall for you certain fundamentals that I believe are worthy of emphasis at all times, but perhaps more especially just now. We have discussed in brief the relative importance of base and increment loads and their relationship to promotional forms of rates. The local application of the A. G. A. principles of cooperative merchandising has been suggested no longer in a defensive and expedient way, but as a constructive measure that promises much in a rounded-out load-building program. We have touched upon the desirability of taking the sales emphasis off volume of merchandise sales and through our salesmen's compensation policies, putting the emphasis on total load connected by both dealers and ourselves. Advertising, utilization in character, has been approved as a powerful medium for fostering among our customers a greater sense of appreciation of the value of our services. Attention has been called to the necessity for having in effect a logical and effective appliance servicing policy. The part that our employes other than salesmen can be induced to play in developing our load has been emphasized.

A fundamentally sound load-building policy is in my opinion, the factor which, above all others will carry the gas business farthest in its continued march of progress.

A. G. A. Receiving Applications for Munroe Award

RECIPIENTS of the Charles A. Munroe Award form one of the most exclusive and honorary bodies within the gas industry. Today it has only three members. Its exclusiveness is assured as only one new member can be added each year. It will always be an honorary fraternity, for its members have been selected as having made outstanding or conspicuous individual contributions toward the advancement of the gas industry. The three members have earned this distinction for accomplishments along entirely different lines.

The first Charles A. Munroe Award was presented in 1929 to Nils T. Sellman, of the Consolidated Gas Company of New York, in recognition of his outstanding work in connection with the development and marketing of the gas refrigerator. It was by this award the gas industry recognized Mr. Sellman's contribution which proved that gas may be applied in altogether new and profitable fields.

The second Charles A. Munroe Award went to J. L. Conover, of the Public Service Electric & Gas Company of Newark, N. J., in recognition of his work in contributing to the general interest of the gas industry by the introduction and widespread application of machine bookkeeping systems to practically every phase of public utility accounting, resulting in reduced costs, improved public relations and more efficient operation.

The third Charles A. Munroe Award was presented last year to Theodore V. Purcell, of The Peoples Gas Light and Coke Company, Chicago, Ill., for his pioneering and constructive leadership in rate making; for focusing attention upon gas development and crystallizing the gas industry's economics to this end.

Messrs. Sellman, Conover and Purcell are the nucleus of this distinguished organization—membership in which can only be earned.

The next award will be made at the Fourteenth Annual Convention of the American Gas Association next October. In the meantime the Committee consisting of F. C. Freeman, president, Providence Gas Company, Providence, R. I., chairman; N. C. McGowen, president, United Gas Public Service Corp., Houston, Texas, and Frank R. Phillips, president, The Philadelphia Company, Pittsburgh, Pa., is entertaining applications.

Under the terms governing this award, the most conspicuous contributions to the general interests of the gas industry may be presumed to include: Research, invention, operating methods or practices which reduce cost of manufacture and distribution, improved distribution or other service, increased sale of gas, development of new uses for gas, improved public and employee relations, promotion of safety, development of improved accounting practices, widening the field of gas-making materials, new methods of manufacture, finance, publicity, new gas works products and by-products, rates, etc., etc.

Applications for the 1932 award consisting of a substantial financial recognition, accompanied by an engrossed certificate, may be made by any individual or company member of the American Gas Association and should be filed with the Managing Director on or before August 1, 1932.

Household Test of A Slow Recovery Water Heater

By E. J. Devlin

Research Engineer,
The Brooklyn Union Gas Co.

IF, within the next five years, the gas industry expects to increase the sales of gas per meter, in the domestic group, ways and means will have to be found to meet the lower purchasing power of users in classes not now enjoying the benefits derived from the use of automatic gas equipment. The slow recovery automatic storage water heater deserves most serious consideration as a means to accomplish this desired end.

Due to the depression, and the resulting limited purchasing power of many of our consumers, a water heater providing a limited automatic hot water supply with a controlled monthly bill should find a market, both among those who have not enjoyed the benefits of automatic hot water previously, and those who have been reduced in circumstances.

Domestic automatic storage water heaters are of three general types, instantaneous, the quick recovery storage, and the slow recovery. Each of these types has its place in the general merchandising plan but each is, of course, applicable to a specific class of purchaser. The first two types mentioned find their natural place in catering to the desires of consumers demanding a relatively unlimited hot water service.

The slow recovery type is so designed as to give consumers a service better than could be obtained with the small coal stove, the water back or the external heat interchanger. This service, within the limits of the heater, is also offered to the consumer at a definite maximum expenditure, aiding the industry in meeting the ever-increasing competition from other fuels. The use of the slow recovery heater not only replaces antiquated methods of securing hot water, but offers the additional advantage of temperature control of the delivered water and at the same time, provides a limit on the cost to the consumer of obtaining this amount of hot water.

From a load building point of view, the automatic gas water heater is very desirable, as it increases the sales per meter, which is most necessary for the economical use of investment.

The merchandising of the slow recovery heater is desirable also from a consideration of load factor. Since the gas input is small and since an almost continuous demand for gas is required by this heater, it offers to any gas company a means for general load factor improvement.

To determine whether or not this heater would meet the water heating demands of an average family, it was thought advisable to have one installed in the home of one of our employees, whose family was classed as representative, and whose general habits regarding the use of hot water could be classed approximately as average. The gas used in this territory is a combination of coke oven and water gas, whose B.t.u. content is 540.

The premises consist of an eight-room house and the family was composed of two adults and two daughters of high school age. In estimating the demands for hot water for various size families, the age of the children must be considered as it is well known that a husband, wife and small child have a greater hot water demand than three adults. There is no maid employed regularly, a woman coming in to clean once a week. The laundry is sent out. The hot water requirements have been very satisfactorily supplied previously by means of a 24-gallon quick recovery automatic storage side arm water heater.

Description of Apparatus

The heater tested is known as a "constant demand automatic gas water heater" and is constructed in 45-gallon and 60-gallon tank capacities.

Briefly, the heater consists of a cylindrical storage tank, inserted in which there is an inverted "U" tube, a burner at one end of the "U" tube supplying the heat. The "U" tube carries the products of combustion up, over and down again. It is in direct contact with water throughout its entire length. The heater has an allowed input of 5500 B.t.u. of gas per hour and requires no flue connection. Orifices, passing 2800, 3400, and 5500 B.t.u. were installed. A mixture of coke oven and water gas, having a 540 B.t.u. content was used. The temperature of the water in this heater is automatically controlled by a thermostat placed within the tank. The heater is also equipped with usual safety devices. The action of the thermostat does not reduce the gas flow to zero. When the water temperature reaches the temperature setting of the thermostat, the gas flame is "banked" to approximately 1½ to 2 cu.ft. per hour. The reduced flame acts as a pilot light.

Arrangement of Apparatus

For flexibility and convenience in conducting the tests, the slow recovery heater was connected in "parallel" with the side arm automatic heater, which had previously supplied the hot water requirements, thus permitting either or both heaters to be operated. Diagram "A" shows the general arrangement of heaters and house piping, water and gas meters.

The arrangement is such that if it is desirable to conduct a draw test or recovery test on the slow recovery heater, the side arm heater may be used for family requirements.

As shown by the sketch when conducting a draw test, the water heated, in addition to being measured by a water meter, is run into a container whose volumetric contents and weight are known.

There is also provided a water temperature recording instrument which is connected at the outlet of the heater, thus supplying on a 24-hour chart, the actual water outlet temperature.

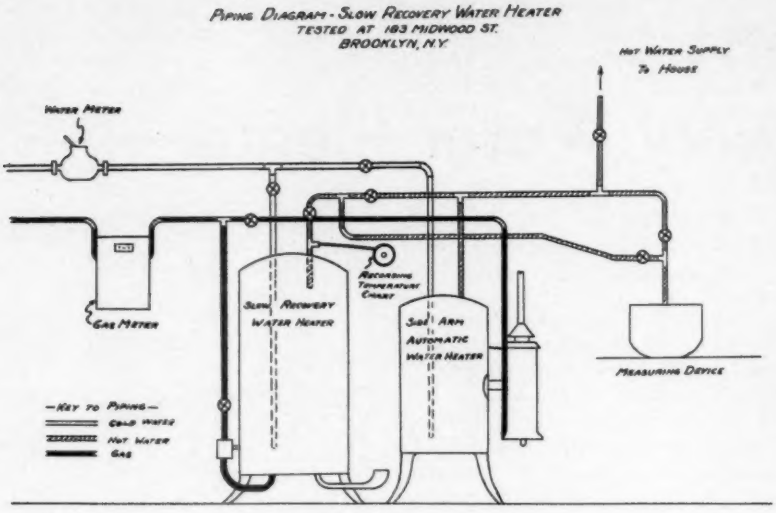


Diagram A

Nature of Tests

It was proposed to conduct what might be described as a "household test"—that is, find out if possible what would be the reaction of the average users to a slow recovery heater and answer the following questions:

1. Will a 45-gallon heater be adequate for the average family of four who would be thrifty with the hot water supply, realizing that the maximum monthly consumption with a 5-cu.ft. burner cannot be more than 3600 cu.ft. and the gas bill not in excess of $3.85 per month.
2. Ascertain by means of a continuous draw-off test how the temperature holds, that is, draw off the capacity of the tank and determine the temperature of the water at intervals during the draw-off.
3. What is the gas to water ratio of this heater; that is over a period of time, how many cubic feet of gas will be required to raise one gallon of water one hundred degrees?
4. Since it is not necessary to connect to a vent, will there be an odor from the products of combustion from the slow recovery heater?
5. Due to the fact that the temperature of the products of combustion are extremely low, will there be an excessive amount of water collect under the heater?
6. Ascertain if possible, whether the recovery time is excessive and just how much it will inconvenience the average user of hot water.
7. Find out the 24-hour load factor of this type of water heater, using a 5-cu.ft. burner and a 10-cu.ft. burner.
8. Determine the length of time that is required after starting heater before water in tank is heated to a temperature of 150°, using the 5-, 7- and 10-cu.ft. burners. This information is desirable in starting up newly installed heaters.
9. Ascertain if there is a tendency to "soot-up" the "U" tube of the heater, which might result in odors from the heater. Also determine if possible, whether there is probability of deterioration of the inside of the "U" tube which might shorten the life of the heater.

Maximum Hot Water Delivery

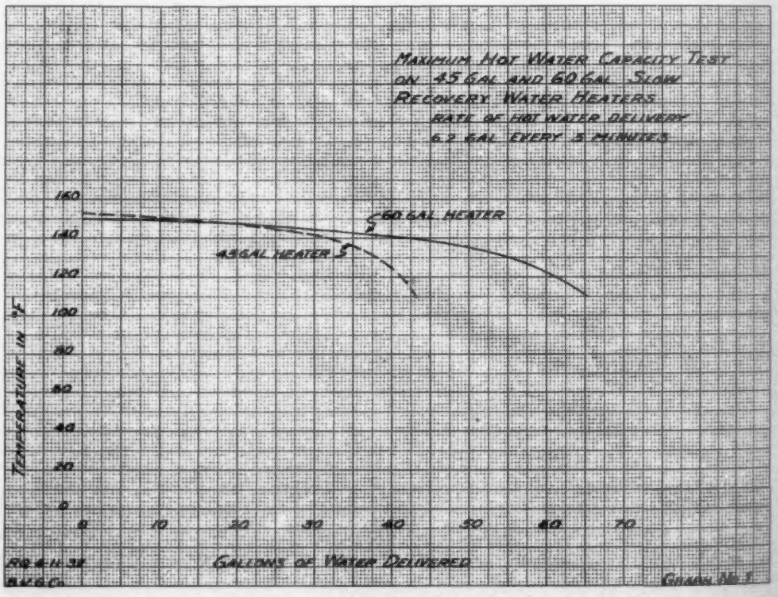
Graph No. 1, shows a continuous draw-off test of a 45-gallon and 60-gallon slow recovery heater equipped with 5-cu.ft. orifices. Six gallons of water were drawn every five minutes with the results shown on the curve. This may be described as a continuous draw-off test, showing the maximum hot water delivery and would have shown approximately the same temperatures whether a 7- or 10-cu.ft. spud had been used.

The design of the heater provides for satisfactory water stratification. Six gallons of water were drawn off during the first two minutes of every five-minute period, the other three minutes permitting of any mixing that might take place. It is interesting to note that after 40 gallons had been drawn from the 45-gallon heater, the temperature of the water was higher than 120°, although falling rapidly. Also, that after 50 gallons had been drawn from the 60-gallon heater, the temperature was 135°.

Draw Test

Tabulation No. 1 shows the results of a draw test at various hours throughout the day from 7 A.M. to 11 P.M., providing for a total draw off of 80 gallons. Three different sizes of spuds were used with gas rates of 2800, 3400 and 5500 B.t.u. per hour respectively.

As would be anticipated, the 10-cu.ft. spud shows the best results, the lowest temperature indicated being



Graph No. 1

138° which was very satisfactory. Due to operating conditions, all tests did not start at the same initial temperature, however, the general results are comparable.

The test indicated that 2800 B.t.u.'s per hour input are insufficient to meet the requirements of this draw test as the recovery during the night is not sufficient to bring back the water to the initial temperature. Thirty-four hundred B.t.u.'s per hour is comparatively satisfactory, as the temperature at 11 P.M., the close of the test, is 137°. The 5500 B.t.u. input is very satisfactory as indicated by the temperatures in the tabulation.

TABULATION NO. 1
*DRAW TEST—45-Gallon Slow Recovery Water Heater
Average Cold Water Temperature 57°—Gas Rate 2800, 3400 and 5500 B.t.u./hr.

		Average Outlet Temperature		
		2800	3400	5500
Time Use	Gallons Draw	B.t.u. 5.2 cu.ft.	B.t.u. 6.3 cu.ft.	B.t.u. 10.2 cu.ft.
7 A.M.	10	160°	144°	158°
8:30 A.M.	4	160°	144°	158°
9:30 A.M.	12	155°	144°	153°
11:30 A.M.	12	144°	139°	150°
12:30 A.M.	3	127°	130°	140°
1:30 P.M.	5	121°	127°	139°
3:00 P.M.	6	113°	123°	138°
6:30 P.M.	6	114°	129°	156°
8:00 P.M.	7	119°	132°	156°
11:00 P.M.	15	118°	137°	157°
	80			

*The Time use of this test is based on a standard Draw Test well known to water heater manufacturers.

Recovery

Since the heater consumes such small quantities of gas per hour, depending upon the size of the spud used, it naturally has a very slow recovery. As shown on Graph No. 1, referred to previously, due to the design of the heater, practically the full capacity of the heater, either 45- or 60-gallon, can be drawn as usable hot water; however, it must be remembered that having drawn all the water, it will take many hours for recovery, thus necessitating a careful use and conservation of the hot water. When 45-gallon heaters equipped with a 5-cu.ft. spud are first installed in a consumer's premises, they should be given twenty to twenty-four hours without use, in order that the water may reach the desired temperature, as otherwise if even small quantities are used, it will take so long to provide a full tank of hot water, that from the start the purchaser will conclude the supply is not adequate.

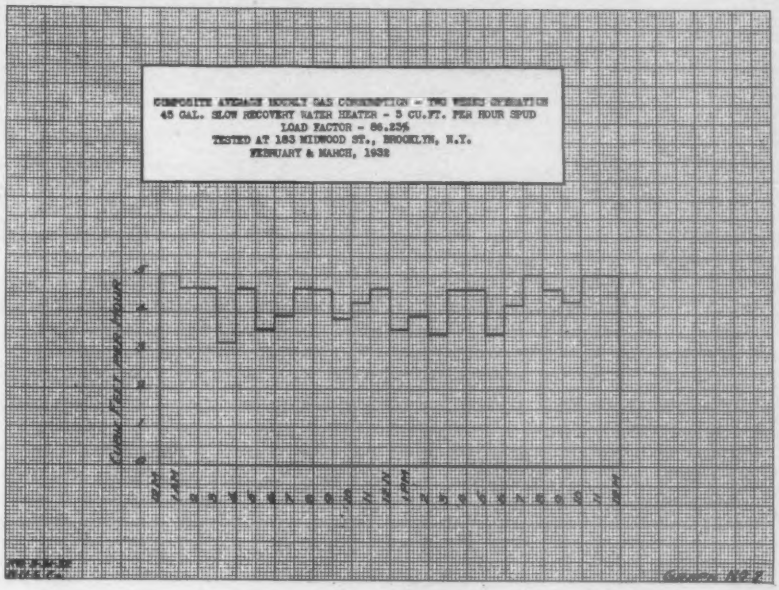
Recovery tests were conducted on the 45- and 60-gallon heaters, using spuds of various capacities, the time required being indicated in the following tabulation.

Heater Capacity	Spud Capacity	Hours Time Of Recovery	Hot Water Outlet Temp.
45 gal.	5.0 cu.ft.	20	150
45 gal.	6.2 cu.ft.	16	150
45 gal.	10.0 cu.ft.	9¾	150
60 gal.	5.0 cu.ft.	27	140
60 gal.	8.2 cu.ft.	14	145
60 gal.	10.0 cu.ft.	12	140

Load Factor

Graph No. 2 shows the composite average hourly gas consumption for a 24-hour period of two weeks' operation of a slow recovery water heater, using a 5-cu.ft. burner. The figures indicate a load factor of 86.23%. Similar data collected for a number of such heaters would probably indicate due to diversification, a load factor approaching 100 per cent. It is interesting to note that in this particular instance, the maximum hourly use of gas occurred between 10 P.M. and 1 A.M. which, from a distribution point of view, is excellent.

Compare this with the results obtained by the use of a 10-cu.ft. burner shown on Graph 3. This resembles to a large extent the results obtained with a quick recovery heater. On a week's operation with a 10-cu.ft. spud, the load factor is shown to be 54.5 per cent. The results of a greater number of heaters would slightly improve this load factor; however, it would never approach that obtained with a 5-cu.ft. spud.


COMPOSITE AVERAGE HOURLY GAS CONSUMPTION - TWO WEEKS OPERATION
45 GAL. SLOW RECOVERY WATER HEATER - 5 CU.FT. PER HOUR SPUD
LOAD FACTOR - 86.23%
TESTED AT 183 MIDWOOD ST., BROOKLYN, N.Y.
FEBRUARY & MARCH, 1932

Graph No. 2

Gas Water Ratio

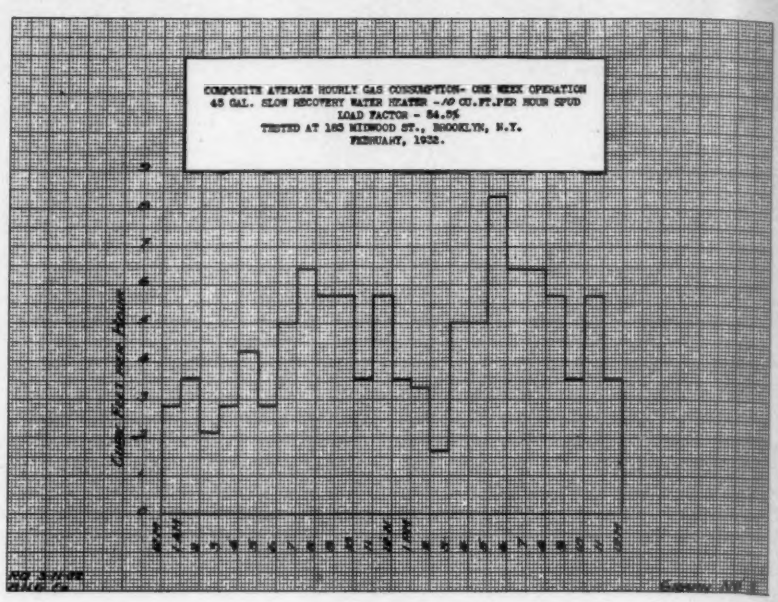
As the best means of judging the performance of a water heater from the view of the household user, it is thought that the most representative is by the determination of the ratio of cubic feet of gas consumed per delivered gallon of water raised 100°. This ratio is a measure of the operating efficiency rather than the ordinary thermal efficiency. The thermal efficiency is only concerned with the heat lost in the flue gas, while the gas water ratio contains factors as tank radiation losses and radiation lost from piping, all of which affect the consumer's cost of hot water service. To make this ratio applicable to all working conditions, as the temperature of the inlet water which will vary in different parts of the country and with the season of the year, and the temperature of the outlet water which depends on the setting of the thermostat, 100° has been adopted as the standard degree rise.

The results of test conducted using different spud sizes are as follows:

Max. Hourly Gas Input (Spud Size)	Daily Water Cons. 100° Gals.	Ratio Cu.Ft. Gas per 100° Gals.	Average Hot Water Temp.
5	36.2	2.40	139
7	43.0	2.49	143
10	43.5	2.18	153
Avg.	40.9	2.36	145

The average ratio obtained as shown in the tabulation above, 2.36 cu.ft. of gas per gallon of water raised 100° compares very favorably with other storage type installations on our lines. A gas water ratio is an indication of what is sometimes called the overall system efficiency. This ratio is a function of the length and size of the hot water piping, the size of the storage tank in relation to the daily demand for hot water, the nature of the use of hot water and the temperature of the delivered water. It is, nevertheless, an accurate measure of the performance of a water heater installed on the district and shows the actual cost to the consumer for heating one gallon of water through a temperature rise of 100°. This ratio would be somewhat reduced if the heater were placed closer to the point of use of the hot water. It is possible to locate this type of heater near the place of use of hot water due to the fact that the heater does not have to be vented.

It is to be noted that the 5-cu.ft. spud supplies hot water at an average temperature of 136° when the thermostat was set to provide a maximum hot water temperature of 150°. During this test no advantage was taken of the adjustable thermostat since the maximum day requirements could not be anticipated, since no laundry is done at home. On several occasions the water temperature dropped as low as 113°. This drop was too great to enable the heater to recover sufficiently over night. It was clear that the hot water demands of the family were of such a nature that a slightly greater recovery or the next size storage tank was needed. When the next size spud, rated at 7 cu.ft. per hour, but actually only passing 6.2 cu.ft. was inserted, the objection entirely disappeared. The heater was now able to meet the family's hot water demands. While this spud was in the burner the number of 100° gallons used increased. At this point, it is well to mention that the members of the family in whose house the test was conducted were not at anytime cautioned to conserve their use of hot water. Their hot water requirements remained the same as when the water was being supplied by the quick recovery heater. There is no doubt that this family could adjust its use of hot water in such a manner that the 5-cu.ft. spud would have given satisfactory service. The fact that the family did not adjust the nature of its hot water demands disclosed that but 1.1 cu.ft. of gas greatly increases the capacity of the heater. This is a very interesting and important point.


COMPOSITE AVERAGE HOURLY GAS CONSUMPTION- ONE WEEK OPERATION
45 GAL. SLOW RECOVERY WATER HEATER -40 CU.FT.PER HOUR SPUD
LOAD FACTOR - 84.5%
TESTED AT 165 MIDWOOD ST., BROOKLYN, N.Y.
FEBRUARY, 1932.

Graph No. 3

With this 10-cu.ft. spud, it is noticed that the average hot water temperature is 150°. The heater is, therefore, performing more like a quick recovery type than a slow recovery. This fact is also substantiated by Graph 3 showing load factor.

"U" Tube

When the heater is first put in operation, or when a sufficiently large volume of hot water is withdrawn and this hot water replaced by cold water, stratifying at the bottom of the "U" tube, considerable moisture is deposited on the basement floor. Under normal operating conditions when the water at the base of the "U" tube is warm, this moisture is not noticeable since it collects in the drip pan on the outlet side of the "U" tube and is vaporized by the products of combustion leaving the heater. A slight amount of moisture always can be felt at the outlet of the "U" tube. During the two months' test period of this heater, there has been a slight accumulation of white powder on the burner and on the floor under the heater. This powder showed the following composition on analysis.

Zinc sulphate—$ZnSO_4H_2O$	92.43%
Undetermined	7.57%
	100.0%

The chemist advises that the deposit is due to corrosion of the galvanized portion of the metal, his statement being as follows:

"All manufactured gas either carburetted water gas or coke oven gas contains traces of organic sulphur which when burned changes to sulphur dioxide. This in combination with condensed moisture will attack the galvanizing of the "U" tube as well as the metal beneath."

Reports from a Western gas utility show that this action is not unduly deleterious to the tube, and samples taken from systems in constant operation in customers' homes show slight deterioration.

We believe, however, that this tube may be treated so this corrosive action can be effectively reduced. We are informed by the manufacturer of this type of water heater, that a protective coating has been developed which will retard corrosion.

In order to eliminate customer complaints, care should be exercised in the selection of the spud size. The most important of the variables that may effect the quantity of gas that will be passed by a given size of spud, are the pressure of the gas and the specific gravity. The following difficulty was experienced.

The owner of a two-family house was sold a 60-gallon heater with a 5-cu.ft. spud. Complaint was received of insufficient hot water. The spud was removed and tested in the laboratory and found to pass only 4.2 cu.ft. of gas at the pressure at which it had been operating.

The following gas rates were obtained on the nine drilled water heater orifices supplied by the manufacturing company.

The orifices were inserted in ½ in. venturi nozzle burner. A mixed gas, average specific gravity of .496 was used. Each of the nine orifices were measured with new MTD drills.

Size Orifice	Gas Rate Cubic Feet per Hour 3" Water	3.5" Water	4" Water
MTD No. 55	—	—	8.47
MTD No. 56	6.79	7.29	7.91
MTD No. 57	6.43	6.99	7.58
MTD No. 58	5.7	6.2	6.7
MTD No. 58	5.55	6.05	6.54
MTD No. 58	5.54	6.0	6.54
MTD No. 58	5.37	5.9	6.37
MTD No. 59	—	—	5.6
MTD No. 60	4.65	5.36	5.83

In companies where coal and water gas are distributed, some variation in specific gravity must necessarily be encountered. As the gravity of a gas increases, the gas rate through any given spud decreases. A spud which permits a 5-cu.ft. per hour gas flow when the gas gravity is .496 will allow only a flow of 4.3 when the gravity is increased to .66.

Suppose a 45-gallon heater equipped with a No. 60 orifice is sold in a home where a slightly larger heater should have been selected, and to make matters worse, the piping in the house was undersized with the result that the gas pressure at the manifold of the heater was 3 in. or under. A complaint of inadequate supply of hot water will result. My experience in the use of a 5-cu.ft. spud indicates that when the temperature is not maintained conditions go from "bad to worse" very rapidly. For instance, when a bath is taken, if the temperature of the water drops as low as 110°, the water is used straight instead of mixing with cold water so that instead of using 10 gallons of hot water at 135°, and mixing with 5 gallons of cold water, the full 15 gallons of water is drawn out of the heater still further depleting it, thereby requiring a much greater time for recovery. For the reason given above and the fact of possible poor pressure conditions, it is advisable to check the pressure at the manifold when the heater is installed, and a spud that will pass at least 5 cu.ft. at the pressure should be installed. It may prove advisable to install spuds having a minimum capacity of 6 cu.ft. This would result in better satisfied consumers and in most instances no appreciable increase in gas bill.

Suggestions to Salespeople

As people learn to appreciate automatic hot water, there is a tendency to use more of it. On investigating complaints of slow recovery heaters already installed, in several instances we find that the temperature control is placed at the extreme position furnishing water at the maximum temperature of approximately 180° F. This is only recommended to the customer to meet peak demands as a constant temperature carried at this degree increases radiation losses and proves deleterious to the heater construction.

This test has shown that, in many instances, the consumer has previously been "oversold," in so far as his demands for hot water are concerned. There are many families on the district whose demand for hot water does not equal or exceed the demand of the family in whose residence this test was conducted. The slow recovery heater in these installations with relatively low B.t.u. input, will give satisfactory service.

The test also shows that a small increase in the gas flow changes the operation of the heater from, in this particular case, unsatisfactory to entirely satisfactory. The salesman can thus be assured that the capacity of the heater can be raised and that satisfactory operation to the consumer is certain. This statement does not mean that discretion on the part of the salesman is not needed in determining the proper location to install a slow recovery heater.

A 60-gallon heater equipped with 5-, 8- and 10-cu.ft. orifice has been tested under the same conditions. With the 5-cu.ft. spud the additional capacity of hot water, that is 15 gallons in excess of the 45 gallons, noticeably improves the hot water service and very satisfactorily meets the hot water requirements of the home, whereas when the 45-gallon was used with a 5-cu.ft. orifice, the supply was not adequate at all times as previously explained. Therefore, when the increased price of the 60-gallon heater does not offer too much sales resistance, the salesman should endeavor to sell the 60-gallon heater equipped with a 5-cu.ft. spud. This increase in tank capacity gives the consumer a greater flexibility in the use of hot water with the same limited monthly use of gas.

General Conclusions

A. From the tests conducted over a two months' period with a 45-gallon heater, it was found that a gas rate of 6.2 cu.ft. per hour provided satisfactory hot water service for a family as described. If family laundry were done at home, it would have been necessary for the thermostat to be set at a higher point to meet the additional demand and the daily uses of hot water curtailed. Tests with a 60-gallon heater indicated that an hourly gas consumption of 5.2 cu.ft. was adequate.

B. The character of the load curve of this heater is excellent from a load factor point of view provided the spud is properly sized for the quantity of hot water to be supplied.

C. That on account of the slow recovery feature of the heater, hot water must be conserved and used sparingly throughout the day. While it is possible to obtain 45 gallons of hot water a day when using a 45-gallon heater, if drawn at normal intervals, should the 45 gallons be drawn, for example, between 7 and 10 P.M. at night, due to the slow recovery, complete recovery to the normal temperature carried would not be accomplished by morning.

D. Test conducted by our laboratory of the products of combustion showed no evidence of any carbon monoxide.

A. G. A. Affiliated Associations

How They Started and How They Have Grown

By John N. Cadby
Executive Secretary

WISCONSIN UTILITIES ASSOCIATION

Herewith is the sixth of a series of articles appearing in the "A. G. A. Monthly" giving an outline of the history and accomplishments of State and district utility associations which are affiliated with the American Gas Association. Work of these associations has proved of great value and a distinct contribution to the advancement of the gas industry. It is believed that this series will focus yet greater attention on the splendid records of these organizations.

WHILE the name of the Wisconsin Utilities Association dates back little more than a decade, that active organization really is the outgrowth of the Wisconsin Gas Association which was formed in 1902 and the Wisconsin Electric Association organized in 1909. At its convention in Milwaukee, March 2, 1922, the gas association and the Wisconsin Electric Association disbanded and their members formed the Wisconsin Utilities Association which now includes gas, electric, electric railway and combination companies of which there are 25 member operating companies, 87 associate members and 510 active members.

J. P. Pulliam, First President of the Wisconsin Utilities Association

The Wisconsin Utilities Association is divided into separate sections—Gas (technical), Accounting, Commercial and other groups which formerly held parallel sectional meetings in connection with the annual convention.

These sections have shown a healthy growth due to their importance to members. Today separate meetings are held at convenient times, which plan has been so successful that since 1925 no general conventions have been held. The attendance at the last meeting of each section was as follows:

Accounting Section, 93 members; Commercial Section 182, Electric (technical) Section 150, Gas (technical) Section 105, Transportation Section 93. The attendance at principal group conferences were: Women's Group 172, Home Service Conference 42, Accident Prevention 34.

In addition there is a General Section which is devoted to the work of Home Service and Women's Conferences, Employee Education, Customers' Relations and matters relating to accident prevention, insurance and protection of lives from highway construction.

At a recent meeting of Executives 67 men attended.

The Wisconsin Utilities Association Activities is the official publication of that Association and it was established in May, 1924. Its circulation has reached nearly 1,200 copies and the number of pages has grown to 20 and sometimes 24 in each edition.

There are about 45 committees in connection with the organization, and the combined staff of the Association, and its affiliated Public Utility Information Bureau consists of five full-time employees. Until recently there were six. The annual budget for the past year was about $40,000. For the coming year it has been reduced to $32,000.

One of the features of the Wisconsin Association is that no conferences, committee or section meetings are held unless there are sufficient matters of importance to justify an assembly of members. Sectional meetings generally are rotated at different points in the State. The interval between successive section meetings ranges from 12 to 24 months.

Subjects considered at all meetings are selected to include the vital problems of the particular group and arrangements are made to permit and encourage informal discussions of these subjects. Expense and time devoted to entertainment are held to a minimum. The Commercial Section is the only group which ever has an exhibition of appliances.

Affiliated Association Activities

Missouri Association of Public Utilities

A. E. Bettis

A. E. BETTIS, vice-president of the Kansas City Power and Light Company, was reelected president of the Missouri Association of Public Utilities at its annual convention held April 28-30, in Excelsior Springs, Mo.

Mr. Bettis is the first president to be reelected to a second term since the association was established. Fred Karr, president of the St. Joseph (Mo.) Gas Co., who, as first vice-president, was in line to be elevated to the presidency, made a personal request that Mr. Bettis be retained for another year and complimented Mr. Bettis for his successful handling of the association's affairs during the past year.

N. R. Beagle, manager of the Missouri Power and Light Co., Jefferson City, Mo., was elected secretary, replacing F. D. Beardslee, of St. Louis. C. E. Michel, vice-president of the Union Electric Light and Power Co., St. Louis, was elected third vice-president, replacing Powell C. Groner, of Kansas City.

The other officers reelected were: First vice-president, Fred Karr, St. Joseph, Mo.; second vice-president, Worth Bates, Missouri Gas and Electric Service Co., Lexington, Mo.; treasurer, Hermann Spoehrer, Union Electric Light and Power Co., St. Louis, Mo.; assistant secretary, Jesse Blythe, Jefferson City, Mo.

The Executive Committee, all retiring members being reelected, is composed of: Maj. T. J. Strickler, Kansas City (Mo.) Gas Co.; Hermann Spoehrer, Union Electric Light and Power Co., St. Louis; W. H. Henby, St. Louis County Water Co., University City, Mo.; W. H. Swift, Jr., Springfield (Mo.) Gas and Electric Co.; D. W. Snyder, Jr., Missouri Power and Light Co., Kansas City, Mo.; Abe Vogel, East Missouri Power Co., Louisiana, Mo.; H. H. Kuhn, Kansas City (Mo.) Power and Light Co.; H. M. Patton, Union Electric Light and Power Co., St. Louis, Mo.

Membership in the Association is composed of electric, gas, water and electric railway companies in Missouri. Approximately 200 utility men from throughout the state attended, many of whom were accompanied by their wives. A special entertainment program was arranged for the ladies.

The place and date for holding next year's convention will be selected by the Executive Committee at its next meeting.

R. W. Gallagher, Cleveland, Ohio, president of the American Gas Association, delivered an address at the morning session, April 29. His subject was, "A Message to the Gas Utilities of Missouri."

Philip H. Gadsden, Philadelphia, Pa., vice-president of The United Gas Improvement Company, was scheduled to make an address on "Public Relations in the Utility Field," but was ill and unable to attend. His speech was read at the Saturday morning session, April 30, by W. H. Henby, president of the St. Louis County Water Co., University City, Mo.

W. H. Onken, Jr., New York City, vice-president, Security Owners' Association, made an address April 28 on the subject, "The Utilities' Position Relative to the Present Financial Situation."

Other speakers and their subjects were: "The Growth of Farm Electrification in Missouri," Dr. E. A. White, Chicago, Ill., director of the Committee on the Relation of Electricity to Agriculture; "The Urgent Need of Cooperation," Dr. G. W. Allison, New York City, field manager, National Electric Refrigeration Bureau; "What's the Matter—and Everything?" H. P. Wright, Kansas City, Mo., president, Kansas Gas and Electric Co.; "The Manufacturers' Viewpoint of the Kansas and Oklahoma Anti-Merchandising Laws," George A. Hughes, Chicago, Ill., president, Edison General Electric Appliance Co.

The closing session April 30 was devoted to merchandising. The report of F. M. Rosenkrans, of Kansas City, Mo., chairman of the Merchandising Committee, gave a general picture of the merchandising situation in Missouri and the widespread cooperation between the utilities and local merchants and dealers throughout the State.

John Redmond, Burlington, Kansas, editor of the Burlington (Kans.) *Republican*, former president of the Kansas Press Association, made an address on "The Effect of the Merchandising Law in Kansas." He presented facts and figures showing that the anti-merchandising law is a detriment to the people in Kansas, especially in the smaller towns. He said that the editors of newspapers in Kansas are virtually unanimous in urging the repeal of the law by the next Kansas legislature.

Convention Calendar

June

3- 4 **American Gas Association Executive Conference**
Traymore Hotel, Atlantic City, N. J.

5-10 **National Electric Light Association**
Atlantic City, N. J.

6- 9 **National Association of Purchasing Agents**
Book-Cadillac Hotel, Detroit, Mich.

7- 8- 9 **Institution of Gas Engineers**
General Meeting, London, England

9-10 **Canadian Gas Association**
Fort Garry Hotel, Winnipeg, Manitoba

15-17 **A. G. A. Course in Domestic Gas Appliances & Home Service Conference**
Testing Laboratory, Cleveland, Ohio

19-23 **Public Utilities Advertising Association**
New York, N. Y.

20-24 **American Society for Testing Materials**
Chalfonte-Haddon Hall Hotel, Atlantic City, N. J.

20-25 **Home Economics Association**
Atlanta Biltmore Hotel, Atlanta, Ga.

27-30 **The American Society of Mechanical Engineers**
Bigwin Inn, Lake of Bays, Ontario, Can.

July

5-22 **Household Gas Appliance Course**
Columbia University, New York, N. Y.

August

24-26 **Pacific Coast Gas Association**
Del Monte, Calif.

September

14-16 **National Petroleum Association**
Atlantic City, N. J.

October

3- 7 **National Safety Council Congress**
Washington, D. C.

4- 5 **Indiana Gas Association**
French Lick, Ind.

10-14 **AMERICAN GAS ASSOCIATION**
Atlantic City, N. J.

November

1- 2 **Institution of Gas Engineers**
Annual Research Meeting, London, England

15-17 **American Petroleum Institute**
Houston, Texas

Pacific Coast Gas Association

THE Addison B. Day Medal of Honor has been announced by the Pacific Coast Gas Association. Through the generosity of Addison B. Day, a past president of the association, this annual award is made available to the member of the association who is deemed to have rendered the outstanding individual service in behalf of the gas industry.

The award may be made for distinguished accomplishment in research; invention; operating methods or practices which reduce the cost of production, transmission, or distribution, or which improve products or by-products; increasing the sale of gas, and outstanding sales development work, including advertising and publicity; development of new uses for gas; improved public or employee relations; promotion of safety;

Delegates attending the Southern Gas Association Convention at New Orleans last month

development of improved accounting practices; and new methods in manufacture, finance or rates.

Every member of the Pacific Coast Gas Association is entitled to make application for the Medal or to be nominated by his friends or the company employing him. Applications or nominations should be made to the association prior to July 1 of each year. The judges will be the president and vice-president of the association and three members of the association appointed by the president.

The first presentation of the medal will be made at the annual convention to be held at Del Monte, California, August 24-26, 1932.

Southern Gas Association

STRENGTHENING the position of gas service in domestic, commercial and industrial fields was the keynote of three full days of activity at the convention of the Southern Gas Association. This was the twenty-fourth annual meeting of the association and was held May 3, 4 and 5 at the Hotel Monteleone, located in the quaint Vieux Carré of New Orleans. The afternoon sessions were held jointly with those of the Southern Regional Gas Sales Conference of the American Gas Association.

Under the skillful direction of President E. N. Avegno, leaders of the industry clearly outlined the present position of gas in the world of business and presented concrete plans to increase the business through advertising, intelligent sales effort and cooperation with sales agencies outside of the utility field.

David F. Kahn, chairman of the Manufacturers' Section of the American Gas Association, inspired the delegates with a plan for setting a par for gas appliance sales that should be "shot for" regardless of any activities of competitors. He also told of the progress that is being made by the Manufacturers' Section toward carrying on an extensive three-year gas appliance advertising campaign.

Dealer sales were discussed from several different angles, first by W. R. Putnam, commercial manager of the Electric Bond & Share Company and by L. C. DeLeon, president, Louisiana-Mississippi Master Plumbers' Association. That the dealers and the gas utilities are working closer and closer toward a common goal was clearly evident from the wide discussion of the subject by members from the floor.

The convention was reminded of the present relationships between "Business and Government," by Major Alexander Forward, managing director of the American Gas Association. Major Forward gave an intimate description of conditions in Washington and in many States, as they affect the utilities and presented pertinent statistics as a basis for constructive thought in dealing with public matters.

Valuable papers on "Holding the Cooking Load" by Hall M. Henry and "Employee-Customer Relation Training" by A. J. Sarré, completed the general program. Most of the papers are available through the Secretary of the Southern Gas Association.

Officers and directors for 1932-33 were elected as follows: President, J. J. Brennan, commercial manager, Memphis Power & Light Co., Memphis, Tenn.; vice-president, B. B. Ferguson, president, Portsmouth Gas Company, Portsmouth, Va.; second vice-president, E. S. Dickey, president, Maryland Meter Works, Baltimore, Md.; secretary-treasurer, S. L. Drumm, New Orleans Public Service, Inc., New Orleans, La.

Directors—Colonel E. Dougherty, C. M. Rogers, W. L. Plummer, James F. Orr, W. C. Gamble, J. W. Owen and George Park.

Nine papers giving up-to-date data on utilization and sales subjects were presented at the sessions of the Southern Regional Gas Sales Conference. These sessions were presided over by S. L. Drumm and C. M. Rogers. The use of gas in large power plants, apartments, laundries, refrigeration, summer air conditioning and house heating were discussed by experts.

The technical sessions were the means of presenting much worth-while material on pipe line and distribution engineering, odorization of natural gas and methods of supplying small towns with natural gas or butane gas.

The splendid condition of the Southern Gas Association was indicated by the report of President Avegno. Membership during the year increased 21 per cent.

A full program of entertainment was provided by committees from New Orleans Public Service, Inc., under the genial leadership of A. E. Merchant. A grand ball Tuesday evening and a cabaret banquet Wednesday night were the high lights. Sight-seeing trips, luncheons and a theatre party for the ladies were greatly enjoyed in the interesting setting.

Music for the convention was furnished by the well-trained orchestra of New Orleans Public Service, Inc.

The association voted to hold its twenty-fifth annual convention in Washington, D. C., during May of next year.

Pennsylvania Gas Association

L. W. Heath

PRESIDENT H. SMYSER BAIR, with the assistance of competent committees on program and entertainment, set a high standard at the twenty-fourth annual convention of the Pennsylvania Gas Association. The well-attended meetings were held at Galen Hall, Wernersville, Pennsylvania, April 26, 27 and 28.

The papers and addresses were well chosen, resulting in a balanced program; the subjects were arranged under the general heads of "production," "distribution," "new business" and "accounting." This was so well done that each division of subject matter held the interested attention

of all the groups present and the ensuing discussion taxed the "time logs" of the respective chairmen.

A full program was well-planned for leisurely enjoyment of the beautiful surroundings of Galen Hall in the afternoons. The evening speakers presented a masterly mixture of business and entertainment. The former were C. E. Paige, vice-president of The Brooklyn Union Gas Company—past president of the American Gas Association—and Thomas F. Kennedy, manager, new business department, Henry L. Doherty & Company. In Mr. Kennedy's unavoidable absence his paper "The Trend of Competition upon the Gas Industry," was read for him.

The lighter side was provided by those well-known after-dinner speakers, Dr. Francis Harvey Green, headmaster of Pennington School, Pennington, N. J., and Strick Gillilan, National Press Club, Washington, D. C., both of whom kept the crowded room in roars of laughter at their topical sallies.

The convention was opened by President Bair of York, who presided at the evening meetings, turning over the sectional activities to Messrs. Boyer (production), Woodring (distribution), Crankshaw (new business) and Corson (accounting).

All of the papers and addresses presented developed broad and interesting discussion from the floor; Mr. Rincliffe's paper on "Purging with Inert Gases" was also ably and informatively discussed by Herbert W. Alrich, of the Consolidated Gas Company of New York, chairman of the A. G. A. Committee on Purging and Placing in Service or Removing from Service Gas Holders and Other Gas Works Apparatus.

The American Gas Association message was delivered by A. Gordon King, its service engineer.

New officers were elected as follows: President, L. W. Heath, Williamsport; first vice-president, F. M. M. Oliver, Philadelphia; second vice-president, A. J. Llewellyn, Kingston; third vice-president, T. W. McDonald, York; Frank W. Lesley, secretary, and W. G. Sterrett, treasurer.

Indiana Gas Association

SECRETARY P. A. MCLEOD, of the Indiana Gas Association, has announced that the 1932 Convention will be held at the French Lick Hotel, French Lick, Indiana, on Tuesday and Wednesday, October 4 and 5. Announcements concerning the program of this convention will be announced later.

A. G. A. Proceedings Wanted

VOLUMES Nos. 1 to 4, 1919 to 1922, and No. 9, 1927 of the American Gas Association Proceedings are desired by Hobart R. Coffey, librarian, Law Library, University of Michigan, Ann Arbor, Mich.

Robert M. Feustel Victim of Nephritis

R. M. Feustel

ROBERT M. FEUSTEL, president of the Midland United Company and an officer and director of various subsidiaries of that company, died of nephritis May 8, at Fort Wayne, Ind., where he made his home. He had been in poor health for a month, but did not become critically ill until about a week before his death.

Mr. Feustel was actively engaged in the public utility business as an operator, management executive, state commission engineer and consulting engineer from the time of his graduation from Purdue University in 1905.

He was born at Fort Wayne, August 5, 1884. He received his preliminary education in the public schools of Fort Wayne and later entered Purdue University from which he was graduated in 1905 with a B.S. degree, taking his C.E. from the same university in 1909. He began his professional career as assistant engineer with the Fort Wayne and Wabash Valley Traction Company at Fort Wayne in 1905.

In 1907 he became assistant engineer of the Railroad Commission of Wisconsin and there gained training with the first state public utility regulatory body given mandatory power over rates and service. He became assistant chief engineer of the Wisconsin Commission in 1911. When the Public Utilities Commission of Illinois was created in 1913, he was called to that state to become its first chief engineer and in that capacity organized its engineering department.

Mr. Feustel left commission work in 1915 to engage in private consulting engineering which he continued until 1929. In 1917 he was elected president of the Indiana Service Corporation, an electric light and power and electric railway company, with headquarters at Fort Wayne.

While thus actively engaged as a public utility operator Mr. Feustel served almost continuously during the next twelve years in consulting engineering and valuation work for both public bodies and public utility companies. Although he was engaged in directing the operation of a public utility company, Mr. Feustel, during that period, served as an expert for state public utility commissions, municipalities and the provincial and Dominion governments of Canada. This was an achievement regarded as particularly noteworthy as indicating the progress of judicial regulation work to a point where cities and states were willing to accept the services of a man experienced in regulatory work even though he was a public utility operator at the time.

In 1929, Mr. Feustel was elected executive vice-president of the Midland United Company which controls public utility companies operating in Indiana and Ohio, including the Indiana Service Corporation of which he was president. In the following year he was elected an officer of other subsidiary companies in the group, including the Chicago South Shore and South Bend Railroad, of which he was elected president.

He was elected president of the Midland United Company on December 15, 1931. In March of this year he was elected vice-chairman of the Northern Indiana Public Service Company and president of the Public Service Company of Indiana.

Mr. Feustel was a member of the board of directors of the Federal Reserve Bank of the Seventh district.

A. B. S. Little Is Dead

ALEXANDER B. S. LITTLE, fifty-three, associated with the franchise bureau of the Corporation Counsel's office, gas and mechanical engineer, who has appeared in New York City utility cases as an expert since 1919, died May 11 at Brunswick General Hospital, Amityville, L. I.

Mr. Little was an internationally known authority on gas, electric light and other public utility rates. He had written two books on "Valuation of Public Service Property," and "Purification of Gas."

Industrial Gas Section

W. F. MILLER, Chairman — C. W. BERGHORN, Secretary

Gas Industry to Take Part in Plumbers' Meeting

A COOPERATIVE gas industry exhibit sponsored by the Consolidated Gas Company of New York, The Brooklyn Union Gas Company, Public Service Electric and Gas Company, Kings County Gas Company, Brooklyn Borough Gas Company, the New York & Richmond Gas Company and the American Gas Association will be held at the fiftieth annual convention of the National Association of Master Plumbers, which will take place at Madison Square Garden, New York, N. Y., June 20-23. Plans have progressed favorably and there is every indication that the display will prove a conspicuous success.

In the spirit of promoting plumber-dealer relationships, the exhibit will include a display of gas company sales and advertising methods and material and also will feature interesting information about Laboratory approved appliances. There will be a complete demonstration showing how the gas industry is helping the plumber to expand his business by selling approved gas appliances. Visitors will learn what automatic gas refrigerators, self-acting water heaters, effortless gas heating and other gas equipment and services have done to create new opportunities for the plumbing industry.

In addition to the cooperative display, the following manufacturers of gas appliances have reserved space for the purpose of displaying their products: American Radiator Company, American Stove Company, Crane Company, Electrolux Refrigerator Sales, Inc., Hotstream Heater Company, Kompak Company, Ruud Manufacturing Company, Hardwick Stove Co., Standard Gas Equipment Corp., Faraday Refrigerator Corp., Roberts & Mander Stove Co. and others pending.

An attendance of approximately 4,000 plumber delegates from all parts of the country is expected. Twenty-five thousand invitations to visit the exhibition have been distributed by the metropolitan and other gas companies and supplies of these printed invitations are available at headquarters for any A. G. A. members.

Gas Measurement Course Attracts 235 Students

THE ninth Southwestern Gas Measurement Short Course, conducted by the College of Engineering, University of Oklahoma, at Norman, April 26, 27 and 28, attracted representatives of gas and oil companies, and natural gasoline and gas equipment manufacturing companies from eighteen states, stretching from the Atlantic to the Pacific. While the registration was not as heavy as last year, owing to economic conditions, the enrollment reached 235, and was composed entirely of representatives of the industries most interested in the short course.

An interesting display of gas measuring equipment was placed in the basement of the Engineering Building and proved popular throughout the course.

The College of Engineering was assisted in putting on the short course by the Corporation Commission of Oklahoma, the Oklahoma Utilities Association, the Natural Gas Department of the American Gas Association and the Natural Gasoline Association of America.

The Corporation Commission was represented on the program by J. J. Hassler, gas and electric engineer of that body, who presented an interesting paper. The address of welcome was delivered by Dr. W. B. Bizzell, president of the University, who was introduced by E. F. McKay, manager of the Oklahoma Utilities Association. Others who were introduced at the opening of the session, by B. L. Maulsby, Tulsa, chairman of the General Committee which arranged the short course, were R. E. Miller, Tulsa, secretary, Natural Gasoline Association of America; A. E. Higgins, Dallas, secretary, Natural Gas Department, A. G. A., who spoke briefly, and J. H. Felgar, dean of the College of Engineering, who discussed the College of Engineering and the gas measurement short course.

The classes were conducted by members of the university faculty, assisted by gas utility and gas equipment representatives. The course included addresses, instruction and demonstration on matters connected with measurement of natural gas and natural gasoline, and principles, repair and testing of various types of meters.

A banquet was held in the McFarlin Church on the second night, which included stunts and other entertainment.

W. R. McLaughlin of the Arkansas Natural Gas Corporation of Shreveport, Louisiana, was selected as chairman of the General Committee for the coming year. This committee will cooperate with the College of Engineering in arranging for the short course for next year.

Among gas equipment manufacturers who were represented with exhibits at the gas measurement short course this year were:

The Bristol Company, The Chaplin-Fulton Manufacturing Company, The Foxboro Company, Metric Metal Works of American Meter Company, Pittsburgh Equitable Meter Company, Refinery Supply Company, Sprague Meter Company, Taylor Instrument Company, Westcott & Greis, Inc., Fisher-Governor Company, Webster Engineering Corporation, The Meter Parts Company, Reynolds Gas Regulator Company, and B. V. Emery & Company, Inc.

Safety Mask Approved

AT its meeting held on April 29, the American Gas Association Accident Prevention Committee approved the Universal Hose Mask, Catalogue HM-30, submitted by the E. D. Bullard Company, San Francisco, California, for the inspection and review of the Committee.

Commercial Section

SAMUEL INSULL, Jr. Chairman J. W. WEST, Jr., Secretary WALTER C. BECKJORD, Vice-Chairman

Holding the Cooking Load*

By Hall M. Henry

Utility Management Corporation

WHENEVER the goal line of the home football team is threatened and thus the team's supremacy challenged, "Hold 'Em Team" becomes the battle cry of every loyal rooter. Today when the gas industry finds out not only its supremacy in the cooking field being challenged but also its glorious future threatened, to say nothing of its very existence being endangered, "Hold the Cooking Load" might well be the battle cry of the gas industry. The importance of the cooking load can well be appreciated, based on the statement just made, yet it might be well to review the facts which substantiate such a statement so there will remain no doubt as to how vital the cooking load is to our industry.

Why the Cooking Load is of Importance:

1. *It Now Constitutes the Major Portion of the Gas Industry's Revenue:*

The revenue for manufactured gas companies is made up of sales to domestic consumers representing 70% of the total revenue and the balance or 30% is received from industrial and commercial consumers. Of the revenue received from domestic consumers, it is estimated that the cooking load furnishes 70%. Thus the loss of the cooking load would mean a loss to the industry of 50% of its *total revenue* and 70% of its domestic revenue.

2. *The Cooking Load Can and Does Absorb the Highest Rates:*

The cooking load is such that people do not select their cooking fuel primarily on cost, but rather on convenience, etc. Furthermore, due to the fact that the consumer makes use of her cooking fuel several times each day, she has a means of valuing the fuel by close contact, and through this daily contact is constantly reminded of the service her cooking fuel renders. Such a valuation of gas service for hot water heating and other uses, due to the absence of this personal touch, is impossible and thus a lower appreciation is placed on the value of gas for these other classes of service than for gas used for cooking purposes. For these reasons the fuel used for cooking can be charged for at a higher rate than can a fuel for water heating and other purposes.

3. *It Makes Possible Lower Rates for the Additional Uses in the Home:*

This statement is readily apparent since, if the customer is using gas for cooking and is paying for gas in the top brackets of the rate schedule, she is absorbing a large proportion of the fixed costs which are necessary to serve the domestic consumer. Furthermore, only a small additional investment is generally required to serve other uses (excepting house heating) in the home. It is evident then that if the consumer uses gas for cooking, lower rates can be made for the additional use than could otherwise be adopted were the cooking load eliminated.

4. *Without the Cooking Load the Future of the Gas Industry is in Doubt:*

As pointed out previously, the cooking load absorbs the high first steps in our gas rate schedules and this type load can well afford these high top rates. Should we lose the cooking load then these high top rates must apply to the other gas used in the home. This, then, means the gas industry has to sell its consumers additional gas at these high top rates, and we all know the consumer can ill afford to pay these high first steps in our rates for gas used for water heating. Furthermore, with the cooking load the electric industry can make and offer low off-peak water heating rates, which means they have a low rate competing with our high rates for this class of business, thus the difference in cost between heating water with electricity and heating it with gas becomes increasingly less and in many instances would mean water could be heated for less with electricity than with gas. Already off peak electric rates of from ¾¢ to 1½¢ per kw.hr. have been made and with these rates water can be heated as cheaply as with manufactured gas at rates of $1.00/M to $1.75/M. Under these circumstances, we are forced to admit that our future would indeed be in doubt should we lose our cooking load.

5. *With the Loss of the Range Load the Gas Industry Would Suffer Greatly in Prestige:*

If the Gas Company should lose the range load the consumers would have another reason then to believe there is something to the idea that electricity is the modern way. Every advance made by our competitors is an additional substantiation of the competitor's statements that the electric way is the modern way, this, even though we know that gas does and can give all the advantages claimed for electric cooking and offers additional features besides.

6. *It is Another Means of Emphasizing to the Consumer the Value of Gas:*

Owing to the constant personal daily contact which the consumer has with the gas range (if she has a modern gas range), it enhances her appreciation of the service rendered by gas and tends to influence her to turn to the Gas Company for the solution of other problems in her home requiring heat.

7. *It Protects the Earnings of the Gas Industry:*

Should the gas ranges be replaced in large quantities the net revenue of the gas companies would suffer due to the loss of this high rate class business, even though additional sales of water heaters *might* be made to off-set the loss in gross revenue occasioned by the loss of the domestic cooking load.

8. *The Loss of the Domestic Range Load Would Make the Financing of New Extensions Impossible:*

The loss of the cooking load would make the raising of money for new extensions very difficult and probably impossible since the revenues of gas companies would be materially impaired without it. Thus the field of activity of the gas industry would be confined to its present sphere.

I am sure you will agree, in view of the above facts and statements, that the pronouncement made regarding the importance of the cooking load is well founded. The question naturally arises, however, "Why should we be concerned about the possible loss of the domestic cooking load?" This question can best be answered by a study of the progress made and a review of the plans which have been formulated and placed in effect by the electric industry.

Progress Made

Starting with 1926 when the electric industry sold over 100,000 ranges and wound up the year with 480,000 electric range customers, or 2.86% saturation, at the end of 1931 there were slightly over a million electric ranges in use and the industry had reached a saturation of 5.37%. Of more importance is the rate of increased sales—these having gained each year over the preceding until in 1930 over 190,000 were sold. In analyzing these figures we should remember they were accomplished without a national concerted effort.

Of even greater interest to us are the reports for certain individual companies since they indicate what might be accomplished under a proper rate structure backed

* Address presented before the New Orleans meeting of the Southern Gas Association held in New Orleans, Louisiana, May 3, 4 and 5, 1932.

by an aggressive selling plan. In Portland, Oregon, the saturation point on electric ranges is now 30% and the average annual residential consumption is 1,800 kw.hr. as against a national average of 550 kw.hr.

Or again the results accomplished in natural gas areas where gas is very low in price might be helpful in visualizing the extent of our competition. In one Natural Gas Property having 22,000 domestic meters 2,200 electric ranges were sold in 1930. In another natural gas company having 40,000 gas customers, 800 electric ranges were sold in an eight weeks' campaign.

Furthermore, today there are some twelve million electric consumers living in territories where special electric cooking rates are available. Thus the rate question is largely settled and there remains the next step of aggressive selling.

All of the above facts deal with the probable effect and rate of growth of the electric range. Let us look at the effect on future load building in the home.

In an electric company having 25,000 residential customers a special off peak water heating rate of 1¼¢ per kw.hr. plus 50¢ per month is in effect. This company has range saturation of slightly over 5% and sold in 1931 some 168 electric water heaters. The importance of these sales to us lies in the fact that 76% were to electric range users and of even greater importance is the fact that 90% of the sales were in gas territory, gas rates varying from $1.15 per M to $1.85. The high percentage of electric water heaters sold to electric range consumers in gas territory is in my opinion a substantiation of the statement previously made that the cooking load is the key to future load building in the domestic field. The following statement taken from the dealer cooperative plan of a large electric utility also bears out this statement: "It is also important that the Associate dealer become proficient in selling electric ranges, due to the fact that his ability to sell ranges will give him the knowledge of load building appliances and the confidence necessary *to take the next logical step, the sale of electric automatic water heaters* which are becoming an important feature of the electric sales program."

What of Future Plans?

The electric industry recognizing the value of the domestic load and the rich rewards awaiting in the way of future development (once the cooking load has been acquired), has set up a three-year program which is probably familiar to most of us but is repeated here for emphasis. This three-year plan calls for the sale of 1,000,000 ranges during the next three years; 225,000 in 1932; 325,000 in 1933; 500,000 in 1934. To accomplish this $12,050,000 will be spent in advertising and promotional activities. Of this amount the electric industry through a special 10¢ per meter assessment and the funds generally available by the industry for promotional purposes will contribute $3,650,000 and the manufacturers plan to raise the balance of $8,400,000 from their own sources. This $12,050,000 is to be spent in a coordinated advertising program covering the three-year period. The advertising is designed to reach a total circulation of 22,954,938. The actual start of the program has been made. Through this tremendous advertising campaign the industry hopes to obtain customer acceptance, and by the threat of this acceptance to influence the thousands of dealers not now selling electric ranges. Hence, the electric industry in making its bid for additional dealer outlets is but carrying out one of its steps in the general plan to take the cooking load. They early recognized that no concerted promotion plan, however effectively laid out and regardless of how well it is financed, can be carried out without multiplying the dealer outlets for electric ranges.

In addition the electric range manufacturer recognizing that some 40% of the gas meters in the country are controlled by combination companies have set up a sales plan which can function independently of the electric utility. Thus one large electric range manufacturer has stated they propose to sell their product through authorized specialty distributors. Furthermore, a special subcommittee on Dealer Distribution has been formed in the electric industry for the following two purposes:

1. Delivering the electric range as highly profitable object of retail exploitation to the thousands of dealers who have hitherto confined their efforts to less modern means of cookery.
2. Enlisting the support of these dealers in behalf of electric range distribution.

The electric range manufacturers have also started their educational work on the dealers and I wish I might give you the full details of this work. The high spots of this may be gleaned from the fact that no effort is being spared to place gas cooking in as unfavorable a light as possible. Every act is dramatized and grossly exaggerated; for instance in one such educational program, a comparison of an ancient model gas range was made with a modern electric range. Even in the comparison of cooking time the operation was so conducted that there was no doubt but that electricity was the fastest. This was accomplished by first heating a kettle of water over the gas burner (these went out of style years ago) then filling the cooking vessel containing the vegetables from this kettle; whereas on the electric range the waterless cooking method was used.

The following represents a fair sample of the kind of mis-information being disseminated.

"We are living in an age of speed. We want to get things done quickly and also as efficiently as possible. When it comes to speed in cookery, we find the . . . range in a class by itself. *No other cooking device can perform any faster, if as fast.*" And they sum up by saying this saving in time is worth at least 1¢ per meal.

"Economy is the keynote of the day.... It's a well-known fact that all flame type stoves are dirty. Even the cleanest *flame fuel* causes a certain amount of *greasy* smudge to collect on walls and woodwork. This means laundry bills and redecorating —an expense eliminated with electric cookery—pots last longer—etc. *ad nauseum*—these represent a saving of 2¢ per meal."

"Electric cookery is modern cooking, just as motoring and flying are modern transportation. The electric range is modern as compared to *flame type* stoves, just as the vacuum cleaner is modern compared to the broom, or just as the electric refrigerator is modern compared to the old ice box, and there is even a greater margin of desirability in favor of the electric range over the old-fashioned *flame type* stoves than enjoyed by these other modern electric appliances. Once you cook on the modern efficient electric range, it is the last appliance you would give up. Some users have even said they would divorce their husbands before they would dispense with their electric ranges." This last sentence "absurd you say" but then is it not in keeping with the other statements, yet there are people who will be influenced by them.

"Luck does not effect electric baking. The automatic temperature control and precision thermometer removes all guess work in your oven cooking. You know things will be just as you would like them. *No flame type stove* can assure this certainty in results. Electricity can because it is always exactly the same."

How Are We to Meet the Situation?

From a study of the preceding, we are therefore forced to the conclusion that we have a condition confronting the gas industry which requires immediate action if we are to successfully cope with the threat to our industry. This naturally brings up the question of what are we going to do to hold our cooking load. As Chairman of the Range Committee of the Commercial Section, I have been permitted to sit in with many of the leading sales executives throughout the industry and from these contacts, certain principles for meeting electric competition have been advanced. Most of these suggestions and plans will be covered by the Range Committee in its final report. I feel, however, that it is appropriate to give you such information as has been compiled by the Range committee and to discuss in detail each recommendation of the committee. The fundamental plans or steps to be taken would seem to fall under the following headings:

(1) *A definite interest on the part of the executives of the gas companies and their support in placing in effect plans and policies best calculated to meet the competition.* For any program to be successful requires the interest and full support of the chief executives of a company. The executives of our gas companies and particularly the executives of combination companies must be fully appraised of the seriousness of the loss of the cooking load, so that nothing can interfere with the adoption of

sound plans and policies to combat the situation. The need for proper executive support cannot be too strongly emphasized since a well-worked-out program can be of little effect if the executives are not in sympathy with it. Our executives cannot but be interested in and extend their full support, once they are fully informed as to the threat which is menacing our industry and the seriousness to our industry of the loss of its cooking load. Thus, the first step in holding our cooking load lies in winning executive support and backing through the proper presentation of the facts relative to the seriousness of the competition confronting us.

(2) *The next step in our program of holding the cooking load should embody a continuous all year round advertising of the advantages of gas for cooking, with special emphasis on its flexibility—speed—economy—and—reliability, plus what it does for the housewife when used in a modern range. Sell the benefits.* The amount of money to be spent for advertising should be gauged to meet the local conditions as they may exist, a large appropriation being made where the competition is particularly aggressive. Some companies have adopted the policy of spending 10¢ per meter to sell the advantages of gas for cooking. In other situations the utilities have expended as much as a dollar per meter per year in successfully combating the electric range threat. Some advertising should be carried on irrespective of whether or not the local electric utility is actively soliciting the cooking load. This is necessary because of the national advertising carried on by the electric industry and electric range manufacturers, coupled with the local dealer tie-ins which will be made and their combined influence on the buying habits of the local consumers.

Few Know What Gas Range Can Do

The advisability of such a program on advertising will be readily apparent when we stop to realize that but a small number of our consumers know what can be accomplished in a modern gas range. In fact, our present vulnerable position is due to the lack of proper advertising. Had we advertised the results to be obtained with our fuel when used in conjunction with the modern and recently perfected mechanical devices, we would have little to fear from competition. Our advertising must be designed to overcome ignorance prevailing as to the proper value of our gas service and this can only be achieved through portraying *the benefits* accruing as a result of the combination of *gas the fuel*, and the modern mechanical devices as exemplified in the present-day gas range. We must stress the leisure hours now made possible with the use of a thermostat and clock, the elimination of guess work in cooking because of the thermostat, the coolness of the modern gas range, resulting from the use of insulation and in addition we should constantly emphasize those features which are peculiar to gas the fuel as distinguished from the purely mechanical devices. Thus, we should stress the *flexibility* of our fuel since in its flexibility lies one of its greatest assets. This can be emphasized through pointing out that gas is not just a one, two or three heat fuel, but you have a variety to choose from, always the proper amount of heat to meet each cooking process, whether one requires a small amount of heat or a large amount. The *quickness* of gas which eliminates waiting is another feature peculiar to our fuel and its advantage to the housewife should constantly be brought to her attention. The test information available from the leading universities indicates that gas cooks in about half the time of that required by electricity.

Another feature of gas, namely; *its low cost of operation*, is one which has always had a tremendous appeal and in these days of strict economy is of double importance. We certainly should lose no opportunity of pointing out the value of gas to the modern day housewife in helping her to keep her budget in line. The economy of gas service can well be made a continuing argument for its use. Here again tests from leading universities are available, which applied to your local situation will enable you to properly evaluate to your customers the savings effected through the use of gas over the use of other fuels. Generally speaking, 3¢ electricity is *twice* as expensive as a dollar manufactured gas to prepare a meal for six people in an oven, whereas to prepare a meal for six people on the top burners 3¢ electricity costs over *three* times as much as one dollar gas.

Another feature which should not be overlooked in our advertising is that of the *reliability and dependability* of our gas service. An interruption in gas service is a rarity indeed and we should capitalize this advantage along with the others, for after all, we must bear in mind that in any product there are certain advantages and certain disadvantages. We must emphasize our natural advantages so that the disadvantages of the competitor's product will thereby be emphasized.

(3) *A well ordered sales program which sets up as its goal the early elimination of all obsolete ranges.* There can in my opinion be no greater safeguard against electric competition than the faithful and successful carrying out of this program. There is little doubt but what if we had all of the obsolete ranges which are now on our lines replaced with modern gas ranges, equipped with heat control, automatic and self-lighting burners and properly insulated, that we would have one of the greatest resistances possible to the sale of electric ranges. A program having as its object the early elimination of all obsolete ranges becomes essential when we stop to realize that in the final analysis our service is valued by the results obtained in the equipment in use in our consumers' home, rather than by any statement or pronouncement made by us. We can then well appreciate that our consumers have had little opportunity (in view of the number of obsolete ranges in use) to place a proper value on our fuel, and without a proper appreciation of its value she is open to the arguments of our electric competitors.

It should also be borne in mind that *no range should be sold unless it has a heat control, self-lighting burners and is well insulated.* Any range sold having less than these minimum mechanical devices is simply postponing the inevitable and continuing to expose our industry to attack. A program for the elimination of all obsolete ranges must take into consideration the use of additional outlets if it is to be successful. Therefore, a dealer tie-in with your range program must be considered.

(4) *A properly equipped sales force must be maintained to contact all customers. Where competition is particularly keen, a special range division whose sole purpose is to sell gas ranges should be organized.* Since one of the major resistances to the electric threat is the matter of education of our consumers to the new and modern gas ranges as well as the sale of these products, it naturally follows that an adequate sales force should be maintained to contact all the consumers at an early date. This sales force should be of sufficient size to properly contact our customers at least three times per year. In order to actively combat the electric range salesmen, a special gas range crew should be developed whose sole function is to sell gas cookery. The electric ranges are being sold by specialists and a proper way to meet this condition is with specialists.

(5) *The proper training of the salesmen in the fundamentals of gas range selling and gas cookery should be carried out.* There can be no more effective weapon against electric competition than the proper education of our salesmen and all employees on the advantages of gas for cooking and in the case of the salesmen on the best selling features to be stressed to properly combat the electric selling arguments. Thus, a thorough grounding of the salesmen in the kind of selling arguments used by the electric range salesmen and the use of selling arguments to overcome these should be carried out. The salesmen should thoroughly understand the different types of so-called modern cooking methods such as waterless cooking (advanced by the gas industry a good many years ago), the so-called thrift cooking, so-called flavor-zone cooking, etc. The gas salesmen should also be fully advised concerning the relative speed of cooking with gas as compared with electricity, the difference in shrinkage of foods (if any) between gas cooked foods and electricity cooked foods, the question of operating costs under prevailing rates, etc.

You would be interested to know the Range Committee of the A. G. A. has a committee which is developing a type of sales training course which can be utilized by the gas industry in its training of personnel. Full details of this will be forthcoming shortly.

(6) *The employment of a competent home service department to carry on cooking classes, to follow up all range sales*

and by education of the gas company personnel on gas cookery methods. The home service department can do much to aid in meeting electric competition. You should obtain from your home service department complete facts regarding the so-called waterless cooking method, flavor-zone method, Thrift method, etc. They should be able to advise regarding whether or not these methods can be used in a gas range and of the relative merits of these different methods of cooking. The home service department can be particularly helpful in pointing out the strong points of gas cookery methods as well as the weak points of electric cookery methods. They can also be utilized in the preparation of pamphlets giving complete answers to the so-called advantages of electric cookery. And they can do much to keep the discussion on cooking methods in the channels where they should be directed, through the proper analysis of the actual results or methods employed in each kind of cooking operation. By this I mean, they can help to differentiate between the results accomplished due to a different method of procedure, rather than due to a different kind of fuel used, just as we can do much in our advertising to differentiate between the results which are due to the mechanical features of the range as distinguished from the results obtained because of the kind of fuel used.

(7) *The creation of a dealer policy designed to build dealer profits in gas range sales, not from subsidy, but through greater sales volume.* This is particularly important, because we find certain dealers (owing to the low price ranges introduced by the industry) have failed to make any money on their gas range business.

Hence a number of them welcome the electric range since it will be sold at a price to insure a profit. Our industry can ill afford to loose its dealers to the electric industry, thus—a strong dealer cooperative sales plan should be adopted and placed in effect immediately.

The dealer cooperative plan must be more than a good will builder, it must be one which means *more profit to the dealer.* This means marking our own ranges so that the dealers can compete, it also means that your own salesmen's compensation plan must be such that it does not encourage active competition as between gas company salesmen and dealer salesmen. This does not mean a straight salary basis of compensation for your salesmen, but it does mean a compensation plan which will not penalize the gas company salesman if he withdraws from a sale whenever the dealer is soliciting the same customer. Our dealer cooperative plan must embody a financing plan such that all dealers can meet our terms. It means our advertising must be designed to sell the idea of the modern gas range rather than our own particular brand. It means our consumers must be educated to the fact that our Home Service employees are at their command whether or not a range is purchased from us. It means a definite service plan which applies to all ranges no matter where purchased. In fact it means treating the dealer and his sales as though he were our own salesman.

This dealer program is not a theory nor are the results something to be hoped for. The principles above outlined have been placed in actual practice and tangible results have already been realized. These principles in one territory where the electric company had an ambitious program, and had attained a number of good electric range dealers resulted in the complete failure of an aggressive sale of electric ranges (even though this same company had been successful in their other properties) and the loss of most of the electric range dealers. So I say to you, the dealers cannot be overlooked in our strategy to hold the cooking load. It behooves us to survey our own local dealer situations and thus determine any policies which should be corrected or new policies formulated to not only win and hold dealer support but to keep them from joining the opposition.

(8) *Wholehearted cooperation with the gas range manufacturers in carrying forward a united program.* In my opinion too little attention has been given by the gas industry to the value of cooperation with its manufacturers. If we will but keep constantly before us the thought that we are not selling gas as such, nor a range—but rather the *results* which are achieved through the combination of the fuel and the equipment, we cannot fail to appreciate the importance of the manufacturer to the success of our industry. I have stated in previous talks on this subject and I want to repeat here, the gas industry can progress only with and so long as its manufacturers progress. Without the backing of strong and financially sound manufacturers we cannot hope to keep pace with our competition. It is from the manufacturers we must look for that equipment which when coupled with our product will produce *results* so far superior to that of our competitors that there can be but one answer and that gas. Our community of interests are so related that we should devise some means whereby each can express his thoughts and ideas, without the stigma of selfishness being permitted to come between us and our common objective. Today the question is not particularly as to whose gas range shall be used but rather whether any gas range is to be used. We should therefore so organize our forces that our combined efforts can be directed at the opposition. We should jointly study our consumer needs and early determine the trend in competitive equipment so that we cannot only meet the competition with equal features but with advanced features. We should lend every support to the manufacturers section in its endeavor to eliminate those practices which are harmful to the industry. The manufacturers are trying to place their branch of the industry in a position to be most helpful to us, through the cross licensing of patents, and have even taken upon themselves the raising of funds to carry out a national advertising program. Let us then do our part by supporting those manufacturers who are doing something for our industry, and by the elimination of those things which we know are harmful to them and in the final analysis are harmful to us.

(9) *The establishment of a competent installation and service department cannot be over emphasized.* I wonder how many of us appreciate the part our installation and servicing departments can play in meeting the competition. It is the opinion of many executives in the industry that our installation and servicing departments have been overlooked as not only a valuable weapon of offense but as a strong defensive force. As a means of spreading the true facts on gas cookery through their daily contacts they can be invaluable, therefore the installation and servicing department should receive training on gas cookery (an outline for this is being prepared by the A. G. A. range committee). In the meantime the Home Service departments can do much to overcome the lack of knowledge in our servicing departments on gas cookery vs. electric cookery. As a defensive weapon the installation and servicing departments can be a factor, through the proper performance of their work. It should not be taken for granted that this work is always well done since in many cases the modern developments have come at a faster rate than have our educational and training systems for installation and servicing departments. Therefore this department must not be overlooked in our program.

(10) *The sale of bottle gas to the territory immediately adjacent to the gas company's area should be actively pushed.* It is important to us to sell bottle gas to the territory just beyond our gas mains for two very good reasons: 1st. Because unless these consumers are sold bottled gas they (or a number of them) will use electricity for cooking. 2nd. These consumers become boosters for whatever fuel they adopt, since the chances are excellent that the results from this fuel when used in the modern ranges developed for that particular fuel are superior to the results in any gas range they ever used. Hence unless bottled gas is sold to these fringe consumers, because of their investment in other types of ranges, we will be stunted in our expansion. There are some instances where due to lack of a program to provide for this outlying territory there are 10% as many electric range users in this outlying territory as gas range users in the gas territory. Thus not only was the utility deprived of 10% more gas range customers but it also was deprived of a market for water heaters, etc. The effect of these electric range users on the consumers within the gas area cannot be under estimated. They are all enthusiastic boosters for electricity because in the electric range they have obtained results never before realized, since they never before had (at least chances are 9 to 1 they did not), a range with a heat control let alone one that was insulated

or had a clock control. Through the sale of bottled gas this territory can thus not only be saved to the industry, but also eliminated as an asset to the electric industry which it becomes if we fail to provide a substitute service for that of our own.

(11) *The establishment of rates with greater promotional features:* Much of the progress that has been made by the electric industry can be traced to its rate structures. The electric companies have eagerly adopted promotional rates and have thus been able to extend and enlarge their potential markets. They have studied their demands and the possible new demands which the domestic load might entail and from this study have found that with the cooking load off peak water heating rates can be made which are competitive with most gas rates. Our industry should therefore give serious consideration to the adoption of promotional rates, with particular regard to the form of the rate, since in many respects rates are more a matter of psychology than of actual facts. The rates should give the impression of being very low for additional uses since if the proper attitude is taken by the consumer, namely that the rates are low, then she will realize she can afford an additional use of gas. The gas companies must be on their guard that low off-peak electric rates for water heating are not used as an argument to install an electric range. In many cases the combined electric range and electric water heating bill will be less than the combined gas bill for these services. I therefore urge you to study your local electric rates in comparison with your own gas rates to make certain there is a real advantage in operating cost in favor of your service.

(12) *Survey your own competitive situation to get the true facts:* A thorough analysis of the opposition's attack should be made, if it hasn't already been done, to determine the extent of the attack. This survey should cover a comparison of rates as previously outlined. It should cover a survey of the dealers handling electric ranges and why they are doing so, a copy of the electric company's dealer plan would prove helpful. A survey of dealers selling gas ranges, the kind, range of prices, quality (whether A. G. A. approved), attitude toward gas company's range sales, a check up of their installation costs and how well done, with the idea of lowering and improving where found desirable. An analysis of the electric companies plans and inducements to buy, such as allowances, premium, free wiring, time payments, prices, advertising appeal, number of salesmen, and selling arguments used, cooking demonstrations, and dealer activities, and last but by no means least a survey of your own consumer's present service and condition of her gas range should be made to find the weak spots. With a thorough knowledge of the kind and the extent of the competitive conditions, policies and plans can be devised to not only meet the competition but overwhelm it.

The foregoing program for holding the cooking load is based on actual plans and policies adopted by companies who have either experienced competition or are beginning to do so. It cannot be too strongly emphasized that the adoption of a sound program at the beginning of the attack is far more valuable than any measures that can be taken once the electric competition is underway. The battle is half won by taking the offensive and preparing the consumers with the answers to the electric man's arguments to purchase an electric range. "An ounce of prevention is worth a pound of cure" is certainly true in this case. It is better to overwhelm the competition at the start than to try to stop its progress once inroads have been made. The electric threat has been met and successfully repulsed by many of our gas companies, but only through aggressive measures. Where the electric competition has been brushed aside with the remark "they will only sell a few ranges anyway," real progress has been made, and particularly is this true where the companies have depended on the low price of their natural gas to meet the competition. In natural gas territories some of the most successful electric range and yes, electric water heater campaigns have been carried out. Low operating cost in itself cannot save the load, it is merely *one* of the weapons of defense.

Let us then resolve to meet the issue fairly and squarely recognizing as we must that we have a competitor whose progress has been made in spite of higher costs for his service. Unless we are on our guard we are likely to find history repeating itself and the gas cooking load going the way of gas lighting. The cooking load can be held for the gas industry and it is entitled to this load because it can render a superior service for a lower cost. Without the cooking our future is in doubt, with it we can and will go to heights little dreamed of today. Our progress, once we have established our right to the cooking load, will be rapid and in quick succession the water heating load, refrigeration, air conditioning, cooling, heating and humidifying loads will become a part of our great service to mankind.

To Present Papers On A. G. A. Forging and Malleableizing

A PAPER entitled "The Influence of Atmosphere and Temperature on the Behavior of Steel with Respect to Scale Losses" will be presented by Dr. D. W. Murphy of the University of Michigan, June 22, before the convention of the Association of Iron and Steel Electrical Engineers in Pittsburgh, Pennsylvania. In this paper a review of the results of a three-year investigation of the scaling of steel in the forging temperature range, 2000° F. to 2500° F., sponsored by the Committee on Industrial Gas Research of the American Gas Association, will be presented.

Briefly, this paper will show the results of varying the velocity of the gas stream, the time of exposure, the temperature, the partial pressure of oxidizing gas, the carbon content of the steel, and the area of the sample on the scaling losses in various simple atmospheres such as air, carbon dioxide, steam, and oxygen. From these the fundamental characteristics of the scaling process are derived. The next step explained will be scaling in mixtures of hydrogen and water vapor and of carbon monoxide and dioxide with particular reference to equilibria.

The third topic will take up the scaling of steel in gas-air combustion atmospheres as influenced by temperature, gas composition and steel composition. In this portion of the paper an interesting method of predicting the effect of any atmosphere on steel at a given temperature by means of the data secured in the study of mixtures of hydrogen and water vapor and of carbon monoxide and carbon dioxide will be presented. The final part of the paper will deal with the effect of small quantities of sulphur gases in the products of combustion of gas and air on the steel. Interesting recommendations regarding the operation of forging furnaces are also included, and the paper will be amply illustrated by curves.

This subject is of considerable interest to engineers inasmuch as it furnishes data which has been lacking until this work was undertaken by the Research Committee.

At the annual convention of the American Foundrymen's Association, Dr. Richard Schneidewind on behalf of the Committee on Industrial Gas Research will present a paper describing the research work being conducted at the University of Michigan under the committee's auspices in the field of Short Cycle Malleableizing.

Monthly Summary of Gas Company Statistics

FOR MONTH OF MARCH, 1932

Issued May, 1932, by the Statistical Department of the American Gas Association
420 Lexington Avenue, New York, N. Y.

PAUL RYAN, Statistician

COMPARATIVE STATISTICS OF 204 MANUFACTURED GAS COMPANIES FOR THE MONTH OF MARCH, 1932

	Month of March			*Three Months Ending March 31*		
	1932	*1931*	*Per cent Increase*	*1932*	*1931*	*Per cent Increase*
Customers						
Domestic	8,736,110	8,880,334	— 1.6			
House Heating	51,071	45,545	12.1			
Industrial and Commercial	407,281	400,292	1.7	*See March*		
Miscellaneous	7,546	6,813	—			
Total	9,202,008	9,332,984	— 1.4			
Gas Sales (MCF)						
Domestic	21,837,480	21,855,087	— 0.1	65,058,810	67,793,704	— 4.0
House Heating	3,134,825	2,643,195	18.6	8,909,210	8,991,274	— 0.9
Industrial and Commercial	6,752,593	7,450,992	— 9.4	20,057,552	22,190,762	— 9.6
Miscellaneous	194,710	214,209	—	612,307	650,560	—
Total	31,919,608	32,163,483	— 0.8	94,637,879	99,626,300	— 5.0
Revenue (Dollars)						
Domestic	25,003,558	25,223,284	— 0.9	74,751,101	78,108,165	— 4.3
House Heating	2,200,916	2,031,826	8.3	6,283,781	6,822,067	— 7.9
Industrial and Commercial	5,837,471	6,426,948	— 9.2	17,359,958	19,324,650	—10.2
Miscellaneous	144,360	176,062	—	437,829	474,424	—
Total	33,186,305	33,858,120	— 2.0	98,832,669	104,729,306	— 5.6
Gas Produced and Purchased (MCF)						
Gas Produced						
(a) Water Gas	16,790,505	17,495,345	— 4.0	46,629,761	52,466,527	—11.1
(b) Retort Coal Gas	2,860,746	2,831,123	1.0	7,933,122	8,872,360	—10.6
(c) Oil Gas	698,363	694,129	0.6	2,453,683	2,352,688	4.3
(d) Coke Oven Gas	3,657,683	4,676,078	—21.8	12,050,861	12,965,735	— 7.0
(e) Reformed Oil Still Gas	437,663	397,743	10.0	1,248,229	1,080,965	15.5
(f) Total Gas Produced	24,444,960	26,094,418	— 6.3	70,315,656	77,738,275	— 9.6
Gas Purchased						
(a) Coke Oven Gas	8,199,357	9,759,557	—16.0	24,792,263	29,274,706	—15.3
(b) Oil Still and Natural Gas	5,527,026	424,067	—	15,412,536	969,341	—
(c) Total Gas Purchased	13,726,383	10,183,624	34.8	40,204,799	30,244,047	32.9
Total Gas Produced and Purchased	38,171,343	36,278,042	5.2	110,520,455	107,982,322	2.4

COMPARATIVE STATISTICS OF 202 NATURAL GAS COMPANIES FOR THE MONTH OF MARCH, 1932

Customers						
Domestic (Including House Heating)	4,569,691	4,606,143	— 0.8			
Commercial	241,951	235,866	2.6			
Industrial	18,150	16,981	6.9	*See March*		
Main Line Industrial	5,551	4,958	12.0			
Miscellaneous	1,971	2,521	—			
Total	4,837,314	4,866,469	— 0.6			
Gas Sales (MCF)						
Domestic (Including House Heating)	32,327,864	32,804,321	— 1.5	101,302,742	109,887,402	— 7.8
Commercial	5,763,798	5,322,111	8.3	17,524,940	17,546,386	— 0.1
Industrial	15,446,843	16,991,917	— 9.1	45,659,503	51,452,631	—11.3
Main Line Industrial	10,248,120	14,231,100	—28.0	35,171,925	39,884,980	—11.8
Miscellaneous	790,563	905,694	—	1,961,784	1,726,697	—
Total	64,577,188	70,255,143	— 8.1	201,620,894	220,498,096	— 8.6
Revenue (Dollars)						
Domestic (Including House Heating)	21,314,877	21,707,684	— 1.8	67,134,783	72,224,619	— 7.1
Commercial	2,616,714	2,529,018	3.5	7,858,913	8,260,683	— 4.9
Industrial	3,459,013	4,160,294	—16.9	10,327,715	12,540,795	—17.7
Main Line Industrial	1,290,707	1,943,305	—33.6	4,420,537	5,331,162	—17.1
Miscellaneous	142,315	119,984	—	344,392	324,643	—
Total	28,823,626	30,460,285	— 5.4	90,086,340	98,681,902	— 8.7

Gas Utility Revenues for March Show Small Decline

REVENUES of manufactured and natural gas utilities aggregated $62,009,931 in March, 1932, as compared with $64,318,405 in March, 1931, a decline of 3.6 per cent, according to reports from 406 companies serving 14,039,322 customers and representing more than 90 per cent of the public utility distribution of manufactured and natural gas.

This represents the smallest decline in revenues reported since May, 1931, and indicates a distinct improvement during the first three months of the current year. In January, 1932, revenues were 11.4 per cent below the preceding year, while in February the drop was only 5.7 per cent.

The manufactured gas companies reported revenues of $33,186,305 for March, a drop of 2 per cent from a year ago, while revenues of the natural gas concerns totaled $28,823,626, or approximately 5 per cent less than for March, 1931.

Sales of manufactured gas reported for March totaled 31,919,608,000 cu.ft., a decline of less than 1 per cent, while natural gas sales for the month were 64,577,188,000 cu.ft., a drop of 8 per cent.

A substantial part of the improvement in manufactured gas sales was due to the greatly augmented use of this product for house heating purposes. During March, 1932, sales of manufactured gas for this purpose aggregated 3,134,825,000 cu.ft. which represents an increase of nearly 19 per cent over the corresponding month of the preceding year. This was in sharp contrast to the drop of nearly 4 per cent which characterized this class of business in February.

Throughout the country generally, industrial gas sales, both for manufactured and natural gas utilities, continued at levels considerably below the preceding year, the decline in sales of manufactured gas for industrial purposes approximating 9 per cent for the country at large, while industrial sales of natural gas were down nearly 9 per cent from March, 1931.

Attractive Window Display

Design which produced good results for the Consolidated Gas Company of New York

BOOK REVIEWS

NATURAL GAS VERSUS ARKANSAS COAL FOR HOUSE HEATING. By L. C. Price, Research Associate Professor of Mechanical Engineering. Bulletin No. 11, Engineering Experiment Station, University of Arkansas, May 1, 1932, Vol. 26, No. 3, 6 × 9". 26 pages. Pub. by University of Arkansas, Fayetteville. 20 cents.

This bulletin describes the method used by the Engineering Experiment Station to test converted and gas-designed steam boilers as well as stoker-fired coal boilers. The results of the laboratory test have been interpreted in terms of the normal heating load in a number of Arkansas towns. Finally, a table is presented giving equivalent amounts of gas per ton of coal for hand firing.

The method of testing the boilers was based on the practice recommended by the American Society of Heating and Ventilating Engineers. Sufficient details are not given in the report to be certain of the test method as far as it applies to gas, but reference is made to the Purdue University Engineering Bulletin No. 36 on gas heating equipment as a guide to the test procedure. —C. G. S.

Correction

UNDER the heading, "Appeals to Gas Companies for Engineering Scholarships," the May number of *The Monthly* printed an appeal made by the Consolidated Gas, Electric Light and Power Company of Baltimore for contributions to engineering scholarships at The Johns Hopkins University, Baltimore, which may have been construed as an appeal being made by the latter institution.

Being located in the same city with the University and knowing at first-hand of the excellent work being done there in gas engineering, the Consolidated of Baltimore did not hesitate to urge the gas industry for support both for scholarships and for sustaining funds, but as the matter was expressed in the item referred to, it may have been construed that Johns Hopkins itself was making the appeal.

It is contrary to the policy of the University to make such an appeal; it was made by the Educational Department of the Consolidated Gas, Electric Light and Power Company of Baltimore as a cooperative service to the University and to gas companies throughout the country.

Henry E. McGowan Passes Away Suddenly

HENRY E. McGOWAN, secretary of The Brooklyn Union Gas Company, died May 7, in Long Island College Hospital after a brief illness.

He had been associated with this company for thirty-four years.

Natural Gas Convention

(Continued from page 231)

civic affairs, conservation in the production and handling of petroleum and natural gas, and correction of the anti-trust laws that are impeding industry progress.

R. D. Garver, general counsel of the Gas Service Company of Kansas City, read a most informative and interesting address prepared by Judge H. O. Caster, of Henry L. Doherty & Co., New York, summing up the important rate, regulatory and tax legislation enacted and proposed by the several states and the Federal government—complete text of which is printed elsewhere in this issue—and counselled that much unjust and unfair legislation and regulatory restrictions could be obviated "if pipe line companies . . . show a willingness to supply regulatory bodies with information regarding their investment and earnings." He further said "The natural gas industry has a great many problems to meet, but that's the gas business, and he who is not willing to meet these problems cheerfully and intelligently will eventually get out. We have the assurance that we are engaged in a useful business, supplying not only a luxury but a necessity of life, and that if our project is well conceived, with an adequate gas supply and an adequate market, if we carry out our obligations to the public and meet our situations intelligently, we will succeed."

Elmer F. Schmidt, general superintendent of the Lone Star Gas Company, Dallas, Texas, gave an interesting description of the progress made and problems involved in the construction of large diameter pipe lines, particularly in 1930 and 1931, in the face of most unfavorable economic conditions, when a total of $580,000,000 was invested in pipe lines, compressor stations and the necessary apparatus required for the transportation of natural gas, to say nothing of the millions expended for exploitation, drilling and market analyses.

"This generation should be thankful they live in a 'Gas Age,'" said Mr. Schmidt, "and we may all pay tribute to the captains of the natural gas industry, who with confidence in the future and entire disregard for the depression, have made possible the extension of natural gas service to millions far removed from the source of supply."

This session closed following the presentation by C. H. M. Burnham, chief engineer of the Colorado-Wyoming Gas Company, Denver, of a paper on "Water Vapor in Natural Gas" and the problems involved in its removal.

During the afternoon the ladies attending the convention were entertained by the wives of executives of the Tulsa utilities at a bridge-luncheon.

That evening the visitors, numbering more than 400, were guests at a cabaret dinner-dance held at the Hotel Mayo. Wm. B. Way, for many years executive secretary of the Natural Gas Association of America and for the past several years managing director of the International Petroleum Exhibition, presided as master-of-ceremonies, and after the introduction of prominent guests and leaders of the industry, presented an unusual and entertaining program of cabaret numbers, a potpourri of music, dancing and sketches burlesquing both the industry and local celebrities. This was followed by an evening of dancing.

The final day opened with the reading of the report of the Wrinkles Committee presented by W. C. Grant, director of advertising of the Lone Star Gas Company, Dallas, Texas, on behalf of H. J. Hoover, Cincinnati, chairman, who was prevented from attending the convention by the serious illness of Mrs. Hoover. Because of the small number of suggestions, or "wrinkles," submitted it was stated that the contest would be continued until November 1, 1932. Captain A. E. Higgins, secretary of the department, read the report of the Committee on Natural Gas Fellowships in the absence of John B. Tonkin, vice-president of the Peoples Natural Gas Company, Pittsburgh, Pa.

In the absence of H. A. Wallace, vice-president of the United Fuel Gas Company, Charleston, W. Va., R. W. Hendee, vice-president of the Oklahoma Natural Gas Corporation, Tulsa, read Mr. Wallace's paper on "Recent Deep Drilling and Large Pipe Line Construction Practice in the East." Discussion of this paper was presented by Ross M. Stuntz, production superintendent of the Cities Service Gas Company, Bartlesville, Okla. Summing up the general utility situation, J. F. Owens, of Oklahoma City, president of the National Electric Light Association and president of the Oklahoma Gas and Electric Company, who was one of the original thirteen organizers of the Natural Gas Association of America in 1906, called attention to the problems involved in improving relations with gas and electrical appliance dealers, the menace of increasing bureaucratic governmental activity and taxation, due he stated to the indifference of individual citizens and their unwillingness to accept their responsibilities as such, and urged greater impetus be given to employee information and training.

A paper prepared by N. C. McGowen, president of the United Gas Public Service Corporation of Houston, Texas, and Mr. Rawlins, on "Conservation of Gas in Completion of Well Drilling and Gas Deliveries," was presented by John S. Ivy, superintendent of the land and geological departments of the United Gas Public Service Corp. Following was a paper prepared by W. W. Freymoyer, of the Foxboro Company, Foxboro, Mass., which appears in this issue of THE MONTHLY.

The morning session was brought to a close with the presentation of an interesting and gripping motion picture, taken by and described by Wm. Kinley, of Kinley Bros., Tulsa, of the successful extinguishing of the Rumanian gas well that resisted all efforts to bring it under control for three years, until the Rumanian government secured the services of the Kinley organization.

The conventions session was brought to a close with the summarization of the entire meeting in the form of a "Question Box and Discussion," presided over by J. D. Creveling, Henry L. Doherty & Co., New York.

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Canadian Gas Association
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Wisconsin Utilities Association
Pres.—E. J. Steinberg, The Milwaukee Electric Railway & Light Co., Milwaukee, Wis.
Exec. Sec.—J. N. Cadby, 135 West Wells St., Milwaukee, Wis.

Fourteenth Annual Convention of the American Gas Association
Atlantic City, N. J. - - - October 10-14, 1932

Personnel Service

SERVICES OFFERED

Industrial sales engineer with house heating management experience, covering sales, service and maintenance. Broad general and technical experience of eighteen years. Age 37; married. **550.**

A young executive with several years' experience in **sales** promotion, advertising and gas heating engineering and sales, is now available. **551.**

Executive-Engineer (39) has served gas, water and electric utilities in operation, engineering, construction and commercial work over a period of many years. A capable organizer and an intelligent worker not afraid of a difficult situation. Desires position of trust in charge of a property, of engineering department, or as executive assistant. **554.**

Sales engineer, technical graduate; twenty years' very broad experience in design and sale of gas plant equipment including gas holder and plate work; also experience in operation and control of large holding company gas properties. Exceptional public utility contacts with all the key men in Eastern properties and holding companies. **560.**

Not "Where are our sales?" but "Where is our man?" Your sales won't come now-a-days. They must be created by a **Sales Director** with creative ability. This one contributed to the A. G. A. training courses in domestic and industrial salesmanship, knows advertising, promotion, hiring, training, supervising—is thirty-nine, soundly aggressive. **562.**

Systems accountant, auditor, office manager in large utility or holding organization. Thirteen years' valuable experience all phases public utility office problems, also many years specializing accounting machine applications, analysis, sales and installations on such work. Age 43, married. Location preferred: Great Lakes region. **563.**

Sales executive, five years with large manufacturer of house heating equipment ready to take on house heating campaign for utility wanting to increase load. Can train, educate and supervise salesmen that they produce results. Size of opportunity for proving ability and compensation are important factors. **564.**

Management, design, supervision, gas utilities, manufactured and natural. Graduate in engineering with over thirty years' experience in all branches of design, erection, operation and management; familiar with valuation and rate procedure. Specially fitted to handle engineering of large property or group of properties. **565.**

Sales engineer of mature experience, thoroughly competent to establish contacts, make plant surveys, design combustion equipment and sell same for utility or manufacturer. Experience gained with outstanding public utility. Always held responsible positions and prepared to demonstrate ability to take charge of sales department, if desired. Experienced in all fuels. **566.**

Experienced **house heating** sales engineer familiar with application of all types of gas heating equipment. Have sold direct for Eastern gas company and covered territory for leading boiler manufacturer. Technical education and seven years' experience. Age 28; married. Eastern or Southern location preferred. **567.**

Public relations manager or assistant available. Thoroughly experienced in all types of publicity; public speaking organizer and public contact man. Knows all angles of utility problems. Desires a position of responsibility where his experience and wide range of activity will be of value to his employer. **568.**

Engineering specialist in gas plant design and construction (Bachelor and Professional Degrees). Broad international experience with the two leading gas engineering and contracting organizations. Thoroughly familiar with the most modern generating, condensing, cleaning and storage equipment. Wide acquaintance with the principal operating executives of the industry. **569.**

SERVICES OFFERED

Auditor, long experience utility accounts, rate case investigations, system installations, examinations for purchase; formerly a professional accountant. Knowledge and experience—business law, Federal tax laws, business methods, sales, management. **570.**

Shop foreman, practical in all branches, inside and outside, on services, mains, etc. Married, has a family and will stand my own traveling expenses. **571.**

One of those fellows who has seen service on the firing line through thick and thin; in distribution and operating fields, from workman's viewpoint, as well as office, **managerial** and executive standpoint. For such a man with strong background, excellent character and sound knowledge, contact this key number. Married; (49). **572.**

Manager (46) fully qualified, having had twenty-eight years' practical experience in the public utility business, with manufactured and natural gas, and gas and electric companies. Experience consists of merchandising, organization work, public relations, group commercial and property management, and individual property management. **573.**

Claims executive, eighteen years' experience in charge of claims department large gas and electric company; also gas-electric steals, city of 900,000. Placed all forms of company insurance; developed and supervised accident and fire prevention. Elective officer since 1920. Have managed departments of 200. Member A.G.A., N.E.L.A. and National Safety Council. **574.**

Gas engineer (38) B.S. in M.E. Sixteen years in the gas industry, starting operating period as cadet and ending as superintendent of combination plant. Last eight years with large gas plant equipment manufacturers, last two years as chief engineer. Experience ideal for plant or holding company engineer. **575.**

Executive. Engineering graduate (29) single. Wide experience operating, commercial, customer service and relations, financial, economic research, merchandising, new business, management efficiency in utility field. Desires connection (domestic or foreign) as junior executive, sales promotion, or efficiency reorganization; utility commission engineer or sales promotion manufacturer of appliances. **576.**

Merchandising manager available for manufacturer of major "load builder." Has practical utility-dealer cooperative plan of proven acceptability. Will contact operating companies and arrange "set up," also personally create and supervise dealer organization. Familiar with procedure where holding company maintains an approved list. **577.**

Industrial engineer; college graduate (32) several years' experience in both manufactured and natural gas sales, design and combustion. House heating experience. Acquainted with change-over of gas equipment from manufactured to natural gas. Electrical experience also. **578.**

Gas **appliance salesman** (36) with seven years' experience retailing all types of gas burning appliances desires position with gas company or manufacturer anywhere in New England. Has own car; will travel. Commission only if you prefer. Married. **579.**

Industrial engineer, (sales) experienced in all branches of industrial furnace application, including surveys, sales and competitive fuel situations, as well as furnace operation; wide experience in both natural and manufactured gas installations; thorough understanding of general sales policies and methods of procedure. **580.**

Manager (Cornell Graduate), at present employed desires responsible position with gas company. Ten years' experience covers manufacture, distribution, merchandising and office work. Excellent record. Age 33. **581.**

POSITIONS OPEN

Manufacturers' agents wanted in a number of territories to take on complete line of warm air furnaces and air conditionings. **0236.**

Domestic gas **appliance salesmen** for work with gas company in the South. Liberal commission basis, permanent position. **0238.**

Manufacturer of approved gas appliances wishes representation, through **manufacturers' agents,** for gas thermostatic controls. **0239.**

Manufacturers' agents and **salesmen wanted** by manufacturer of gas boilers and furnaces, also residence air conditioning systems. Commission basis. Advise lines now handling, and territory covered. **0240.**

Large nationally known manufacturer of automatic water heaters in complete price range, desires **distributor** for Columbus, Ohio territory. An attractive and exclusive franchise is available. **0242.**

Distributorship on complete line nationally known automatic water heaters for Dayton, Ohio territory is available. No missionary work to be done. Real opportunity for live organization. In writing, advise lines now handling. **0243.**

ANSWERING ADVERTISEMENTS

Poor letter-writing is so prevalent, especially among job-seekers, that a well-prepared letter stands out vividly from the mass; to be able to write a good letter is not only important, it is essential.

Every good letter of application must be mechanically perfect and correct as to spacing, margins, spelling, neatness, and general appearance. It must contain the necessary facts and the thought must be expressed in a logical, concise, straightforward manner.

Unless specifically instructed otherwise, *always write your letter of application on a typewriter.* Give only those facts concerning your previous experience which have some bearing on the job for which you are applying. Always state the facts required by the advertisement.

To determine the facts that should be included in your letter try to put yourself for a few moments in the attitude of the employer who is to receive it. Always visualize your letter as being one of a large pile and realize that to gain recognition you must present only significant facts.

Having written as briefly as you believe possible, go over your letter carefully, eliminating every word or phrase that is not absolutely necessary to the clear expression of the thought. It is surprising how many unnecessary words you will find, and how considerably you will be able to shorten your letter.

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